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Editor's Comments

THIS first issue of THE AMERICAN NEPTUNE under new editorship represents an attempt to broaden the coverage of this journal while maintaining the fine traditions of its earlier editorial direction.

The first article by Gaddis Smith deals with the importance of the sea to the agricultural development of Connecticut in the Colonial period. It is followed by Robert Webb's interesting view of how steam revolutionized Arctic whaling—especially pertinent in view of the new exciting exhibit on steamships which has just opened at the Peabody Museum here in Salem. This is followed by an article detailing how two intrepid women joined whaling ship crews for extended periods during the middle of the nineteenth century. We hope this will help dispel the legend that women played little role during the great period when American sailing vessels discovered the wider world beyond our shores.

Next we are including a remarkable study of how Queen Elizabeth I's ministers planned for the attack on England by the Spanish Armada. This article by Ronald Pollitt, an expert on Tudor history, may change many entrenched views which have seen this campaign as a victory of Queen Bess' seadogs who were able to prevail despite her somewhat incompetent bureaucrats. This is followed by a new look at the changes for the better which took place as the American seamen moved from ships using sail to those using steam. This article by Kenneth T. Blume and entitled 'The Hairy Ape Reconsidered: The American Merchant Seaman and the Transition from Sail to Steam in the Late Nineteenth Century' may surprise many who have perhaps overromanticized service on the sailing vessels of the past, and last of all among the articles we have David Syrett's account of a crucial battle with German U-boats which took place in February 1943—one which helped determine the outcome of the war at sea during World War II. Finally we are including a long appreciation of the impact of Robert Albion upon the study of American maritime history, since we regard Albion, who died this summer, as one of the founders of our discipline as we now understand it.

This issue then is concluded with a listing of the new exhibits at most of the maritime museums in North America for the coming year and a long and thoughtful book review essay written by Colonel Roger Willock on a new collaborated volume dealing with the many aspects of our naval and maritime history in recent times which should interest all who read our journal. Those who study this essay should have a good idea of the aims and interest we will be stressing in the years to come.

ARCHIBALD R. LEWIS

Salem, Massachusetts

Agricultural Roots of Maritime History

By Gaddis Smith

ONE of the great delights of maritime history is the scope it grants for operating across the full scale of human experience. At one end of the scale we can examine specific vessels, trace voyages moment by moment, and probe the character of particular people. At the other end we can grapple with the most fundamental forces in history—chronicling the mass movement of commodities and population, the spread and impact of technology, the rise and fall of empires.

Our challenge is to deal with both ends of the scale and to show how they are related. Too much of the particular, and we can become spinners of fo'c'sle tales and little more. Too much of the general and we can become theorizers or statisticians, analyzing bloodless global data, forgetting people.

Long live the fo'c'sle tale. But let each tale illustrate what should be the motto for maritime history: THE SEA CONNECTS ALL THINGS. We should, for example, ponder the fact that the introduction of factory-made shoes in New England accounts for the presence of the brig *Pilgrim,* with Richard Henry Dana before the mast, on the California coast; or the fact that the expansion of the British tropical empire in the nineteenth century had something to do with harvesting ice on the Kennebec; or that the electrification of urban America gave birth to the great coal schooners of the turn of the century.

Since the sea connects all things, there is no single or predominant theme for maritime history. The important thing is to be guided by the principle of connectedness. In that spirit the present paper explores agricultural roots. It notes some regional and global agricultural conditions of the eighteenth and nineteenth centuries and then follows the consequences of those conditions to particular ships, voyages, and people. Another occasion and other illustrations could use demographic, urban, or industrial roots just as well.

The mutual dependence of the sugar-producing and slave-labor economy of the West Indies and the food-growing economy of the Middle Atlantic and New England region is in its general dimensions one of the best known instances of the connections between agricultural and maritime endeavor.[1] The central role of slavery, the naval combat that ranged around the islands, and the importance of the sugar trade in the coming of the American Revolution all account for the attention the subject has received. And yet there are aspects of the situation still in need of closer examination.

Let us look, for example, at horses and live cattle. The climate and soil of the West Indies are not suited for animal husbandry, just as they are unsuited for raising grain. But the sugar plantations of the seventeenth, eighteenth, and early nineteenth centuries had a great need for horsepower—literally horsepower—to turn the mills, pull wagons, and provide transportation for the aristocracy. The plantations also required oxen, cattle, mules, and sheep. North America supplied the general need for provisions. The colony and then state of Connecticut specialized in filling the market for large live animals. Connecticut had no ocean fishery of significance and thus left the lucrative salt fish trade to Massachusetts. Connecticut grew some grain and vegetables, but could not compete with Pennsylvania and Maryland. But the fine pasture of its numerous river valleys and low uplands was well suited for raising horses, oxen, and cattle. Numerous seaports—Stamford, Bridgeport, New Haven, Middletown, New London, and a score of smaller places—meant that no farm was very far from a tidal wharf and a ready export market.[2]

Thus the West Indies plantation as market and the Connecticut farm as supplier provided the foundation for a thriving and often dangerous enterprise, an enterprise which began in the seventeenth century and lasted for two centuries. Now let us look at the particulars.

As early as 1660 a Connecticut law required that all horses be registered 'with marks both naturall and artificial, as also the colour and age of ye beast' lest stolen

1. For the New England connection see Richard Pares, *Yankees and Creoles: The Trade between North America and the West Indies before the American Revolution* (Cambridge, Mass., 1956). The larger context of a 'grand maritime empire' is described in superb detail by Richard B. Sheridan, *Sugar and Slavery: An Economic History of the British West Indies, 1623-1775* (Baltimore, 1974).

2. Richard J. Purcell, *Connecticut in Transition, 1775-1818,* new ed. (Middletown, Conn., 1963), pp. 74-77, 103-11.

animals be shipped and lost forever to their rightful owners.[3] In the middle of the next century an authoritative agricultural observer wrote that farmers need never fear 'having too much cattle for the constant export of beef, pork, and live stock of all kinds, to the West Indies . . . will never fail them, let their quantity be almost what it may.'[4]

The craft engaged in the Connecticut animal trade in the colonial period were appallingly small. For example, the sloop *Sea Flower* which sailed from Branford for the island of Barbados in June 1763 was 42 feet on the keel with an 18.5 beam. The master's journal recorded the cargo: 'one large horse, one old Blak mear, 2 horses for Daniel Linley, 11 sheep, 1 hog, 1 barrell tobacco, 2 dozen fowls, 1 barrel apples, cheese, bread, and pork.' The voyage took eight weeks—very slow even for the boxy craft of that time. The sheep died and were tossed to the sharks. Otherwise no serious problems. *Sea Flower* returned to Branford and sailed again in November—this time with 24 horses on board for the somewhat closer island of Antigua. The wind blew from the north and the voyage was fast—less than four weeks.[5]

After the War for Independence the West Indies trade in general and the animal trade in particular boomed. As one Connecticut historian has written: 'Men were convinced that the state's future wealth lay bound up in shipping, the sister industry of agriculture.'[6] Here are some details. In 1784 a newspaper advertisement in New Haven tells us that the brig *Charming Polly* will take horses on freight for the Windward Islands. Farmers are told that 'the vessel is equal to the best in this port' and that they should apply to Mark Leavenworth for further particulars. Another advertisement announces that the brig *Hetty* has arrived with molasses, sugar, and coffee 'for sail' and that she seeks horses to carry to the Windward or Leeward Islands.[7]

By 1787 traffic was so brisk that ten vessels with 302 horses and oxen depart New Haven during a single two-day period. Middletown shipped over 2,000 head that year and New London, the leading horse port, nearly 7,000.[8] My preliminary calculation is that Connecticut shipped 15,000 head in 1787. If we assume 30 head per voyage, that makes 500 voyages. And if we further assume 2.5 voyages per year per vessel, that makes 200 vessels engaged in the cattle and horse trade alone. With five men per vessel, that means 1,000 employed on the navigation side alone. This is a large number for a state whose total population in 1790 was 238,000 and where nearly 90 percent lived on farms.

Large live animals are very difficult to handle on small boats. Connecticut vessels in the animal trade were mostly sloops and brigs, with a few schooners and a rare ship. The animals were carried on deck, harnessed in place, and meagerly protected by an awning which, together with the invariable bales of hay, much obstructed the working of the vessel. The weight of animals on deck made for an unstable center of gravity. Contemporary accounts tell of numerous vessels sinking or else being saved only by cutting away the masts and jettisoning the horses. We learn, for example, that in February 1785 a new sloop belonging to Stratford, bound for the West Indies with horses, was 'overset in the Sound by a sudden Flaw of Wind. The People saved themselves in the Boat.'[9] Or we have a report from Captain Jonathan Sabin of the New Haven sloop *Sally* that he lost two seamen when his vessel was dismasted. In the accident he and 'black Tom' were swept overboard as they were trying to remove a bale of hay which was obstructing the tiller. Sabin wrote: 'I was caught in the topping-lift and Tom by a small rope around his leg, which happy circumstances saved our lives.'[10] We also learn that one Captain Brookes of a vessel 'belonging to the Connecticut River' lost 16 horses by lightning a little to windward of Dominica.[11] January 1790 brought bad news for New London. The brig *Neptune* lost her mainmast and 36 horses, while the ship *Josephus* lost main, mizzen, 38 mules, 9 cows, and 3 horses.[12]

In the nineteenth century the vessels and cargoes increased in size, but the difficulties were the same. The experience of Captain Henry Bowers tells its own story. September 1815—hurricane season—found Bowers in command of the brig *Lambert* on a voyage from Middletown with sheep for Bermuda. A hurricane came. Neither heaving to nor scudding under bare poles prevented tremendous seas from sweeping over the deck and drown-

3. Percy Wells Bidwell and John I. Falconer, *History of Agriculture in the Northern United States, 1620-1860* (Washington, 1925), pp. 44-45.

4. Harry J. Carmen, ed., *American Husbandry* (New York, 1939), pp. 58-59. This is a modern annotated edition of a classic account written in the middle of the eighteenth century and first published in London in 1775. Scholars believe that the author was probably the famous mapmaker John Mitchell.

5. Sloop *Sea Flower*, Samuel Baldwin master, LOG 309, G. W. Blunt Library, Mystic Seaport Museum.

6. Purcell, p. 74.

7. New Haven *Connecticut Journal*, 7 January 1784.

8. Ibid., 2 and 23 January 1788.

9. Ibid., 16 February 1785.

10. Ibid., 29 November 1786.

11. Ibid., 28 July 1784.

12. Ibid., 20 January and 10 February 1790.

ing the sheep. After two weeks the brig made Bermuda—but with no cargo to sell. Soon Bowers headed for Turks Island, in the Bahamas, for salt. On the way the brig was brought to by an armed schooner under Spanish colors who, as Bowers wrote, 'pretended to be very afraid of Carthegenia Privateers; from this circumstance I judge him one himself.' Bowers was lucky for once. He handed over a gift of chickens and the schooner sailed away. The brig loaded and departed Turks Island in late October with a full cargo of salt—incidentally another commodity with close agricultural connections. But soon an uncontrollable leak developed. The pumps choked. *Lambert* began to sink by the bow. Fortunately another brig saw the distress signal and stood by. Bowers's final entry for the voyage reads: 'at 10 Minutes before 10 O'Clock on Sunday morning the 22nd of October the Brig Lambert of 214 Tons a first rate vessel departed head foremost with a crash and almost as swift as a ball from a cannon's mouth. Alas! Poor Lambert. Taken on board Brig Day of NY.'

But Bowers was not down. We soon find him in command of the brig *Gleaner* for a June 1816 voyage to Bermuda with cattle. The weather was overcast and Bowers's skill as a navigator being nothing extraordinary, he could not find Bermuda. 'We have been boxing about in the Latitude of Bermuda for the last 8 days . . . we have little hay left and provender is about gone.' At last the island appeared. *Gleaner* hauled alongside the wharf and the cattle were sold to Trimingham & Co. On the return voyage there were nothing but headwinds. 'Oh what's the use of fretting—the devil and all his host are combined to oppose me. We are now 4 days from port and what have we done: bang'd and jamb'd and bother'd and raised hob.' *Gleaner*'s next voyage—to Martinique with cattle—was quick and successful. Bowers did not lose all the time.

Then came the horrific voyage of January 1817 with a departure from Saybrook with horses. The first day out *Gleaner* encountered very strong gales and snow. More violent gales on the second day. The brig began to roll her rails under and the main deck was constantly filled with water. Captain Bowers's journal again: 'At 5 PM the Horses began to give out; at 6 a great part of them unable to stand and notwithstanding all our exertions, could not keep them on their legs. Threw overboard . . . about 15 Bundles Hay to ease the vessel. Middle part the wind a Hurricane from WNW, and really the night a dismal one; all or nearly all our Horses down on the Larboard side in a drowning condition; 5 or 6 also in the same way on the Starboard side; cut some of the dead ones up and threw them overboard . . . remainder of the 24 Hours employed cutting up & throwing over dead Horses. At noon we had only 20 alive. . . . Lost all our fowls and pigs and some small spars.' *Gleaner* reached Barbados 2 February.

Bowers kept on. In July of 1817 he took command of the brig *Reaper*—sister to *Gleaner* (one need scarcely remark on the agricultural quality of the names). This time the only difficulty was a drunken mate whom Bowers confined to the steerage to sleep it off. The second day out the captain hauled the mate back to the cabin and 'gave him a vomit to clear him out. He tells me he has lived on nothing but Rum for the last 3 days and believes he has drank enough to kill him.' Three weeks later, with the mate sober, they arrived at St. Eustatius and sold the horses. A good trip, but after that Bowers turned to the Mediterranean trade.[13]

The horse and cattle trade from Connecticut subsided as depression settled over the British West Indies, but even after the Civil War a few old firms like Trowbridge in New Haven were still selling a few animals now and then, the last of a trade two centuries old, rooted in agriculture, and of central importance to the prosperity and survival of two economies.[14] The *Gleaners* and the *Reapers* have no Melville or Dana to enshrine them—only old port records, newspaper accounts, and the logs and journals of tough old birds like Henry Bowers. Those little vessels were not as romantic as whalers, clippers, or packets—but numerically and economically they were just as important a part of maritime history as their more prestigious sisters. The short voyages to the West Indies lacked the drama of rounding the Horn or raising Java Head, but there was risk and adventure aplenty. Comparative rates of death and injury in different trades are very difficult to calculate, but few if any enterprises were as dangerous as the Connecticut horse and cattle trade—especially in the winter months.

* * *

Now let us move into the middle of the nineteenth century for another example of agricultural roots. Among the great forces at work in the world at that time were urbanization, industrialization, the very rapid growth of population in Europe and America, and the concomitant need to produce vast quantities of fiber for machines and food for people. The connection of cotton and shipping

13. Henry Bowers journals, LOG 827, Mystic Seaport Museum.

14. Journal of B. Wellington, bark *Reindeer* of New Haven, 25 September 1868, LOG 422, Mystic.

has been skillfully explored.[15] The grain trade also has been often described and analyzed.[16] A comparatively neglected subject, however, is bird droppings and their role in a complex inter-hemispheric relationship.

The search for an effective fertilizer to revitalize depleted soil in Europe and America was almost as compulsive in the nineteenth century as the search for gold—and certainly more important for the well-being of millions of people. The greatest single find was the guano deposits, up to 200 feet of compacted bird droppings, on the Chincha islands off the coast of Peru. The extraordinary power of this material to increase crop yields produced a 'guano rush' coinciding in time with the California gold rush. Beginning in the mid-1840's and extending until about 1870 when the deposits had been nearly all hauled away, Peruvian guano was one of the most valuable commodities in international trade. Often there were 200 vessels simultaneously loading or waiting to load at the Chinchas and thence for Baltimore, Norfolk, New York, Liverpool, Rotterdam, Antwerp, London, or Hamburg—the principal receiving ports. Baltimore, for example, received 445 tons of Peruvian guano in 1844; 25,500 tons in 1852; and 54,134 in 1860.[17] Since the average cargo per vessel was less than 1,000 tons in this period, this trade employed an enormous number of vessels. It was not aesthetically pleasant, but sooner or later almost every large general trading vessel of the time, including many a fine clipper, participated in it. There was money to be made.

The existence of these vast deposits was the result of unique meteorological and oceanographical conditions on the west coast of South America. The cold and powerful Humboldt current sweeps up from the Antarctic, churning a rich soup of nutrients to the surface and providing food for billions of anchovies and other varieties of small fish. The small fish are food for large fish, including the famous tuna of the region, and they are also food for birds. What goes in one end of a bird comes out another. Bird droppings are washed away by rain in most parts of the world. But the winds of the Peruvian coast drop their moisture on the eastern side of the Andes. On the ocean side it virtually never rains. Thus the bird droppings piled up over the centuries and especially on the cluster of Chincha islands where uncounted millions of birds made their nests.[18]

Digging this guano was hazardous to health. The ammonia-laden dust permeated everything, including the lungs. Black slavery had been abolished in Peru and the Indians were too smart to be lured into the work. The Peruvian government, owner of the deposits, turned to another form of slavery: Chinese indentured labor, or coolies, as every westerner called them. The coolies came from the port of Amoy where several notorious European firms maintained barracoons, similar in design and purpose to the slave barracoons on the African coast. The coolies were collected through enticement, misrepresentation, and kidnapping. Illiterate and unemployed victims of the social and political turmoil of China in the era of the opium wars and the Taiping Rebellion, they were sold to labor contractors and obligated to work for four or five years at a pittance. Many who went to the Chinchas did not work their full term. They did not live that long.[19]

The details of the guano trade would require a separate article or book. Let an account of one ship suffice to represent thousands. The ship *Atlantic,* 699 tons, Joseph J. Lawrence master, departed New York in July 1848 in ballast for the Chinchas. In November the ship entered at Callao, as required by Peruvian law. Here some of the crew deserted. Captain Lawrence had them caught, brought back to the ship, flogged, and put in irons.

Soon *Atlantic* was at the Chinchas, secured beneath one of the huge hoppers constructed high above on the cliff. A long canvas chute, like a great elephant trunk, led from the hopper to the ship's hatches. Lawrence described in his journal how the guano 'comes down at times so fast and in such bodies that it makes the Ship Tremble from her keel to her trucks; in this manner a ship can take on board from 250 to 400 tons per day. They can load a cargo of 1200 tons in 4 days.'

In the next step the men had to go below to arrange the loose guano. 'It is impossible,' noted the Captain, 'for the men to stay in the Hold over 5 minutes at a time and then they come up with tears running from their eyes and bleeding at the nose. The Amonia is So Strong.' The

15. Most notably by Robert Greenhalgh Albion, *The Rise of New York Port* (New York, 1939), ch. 6.

16. Morton Rothstein, 'The International Market for Agricultural Commodities, 1850-1873,' in David T. Gilchrist and W. David Lewis, eds., *Economic Change in the Civil War Era* (Greenville, Del., 1965), pp. 62-73; and the same author's 'America in the International Rivalry for the British Wheat Market, 1860-1914,' *Mississippi Valley Historical Review,* XLVII (1960), 401-18.

17. Avery Odelle Craven, *Soil Exhaustion as a Factor in the Agricultural History of Virginia and Maryland, 1606-1860* (Urbana, Ill., 1925), pp. 148-53. See also W. M. Mathew, 'Peru and the British Guano Market, 1840-1870,' *Economic History Review,* XXIII, 2nd ser. (1970), 112-28.

18. George W. Peck, *Melbourne and the Chincha Islands* (New York, 1854); Robert Cushman Murphy, *Bird Islands of Peru* (New York, 1925); Tui De Roy Moore, 'Guano,' *Oceans,* XIV (1981), 45-50.

19. Watt Stewart, *Chinese Bondage in Peru: A History of the Chinese Coolie in Peru, 1849-1874* (Durham, N.C., 1951).

Captain complained that the stuff was in his watch case and that the dew at night created a slick 'slippery as grease.' When the wind blew, clouds of guano extended to sea as far as the eye could follow. Vessels approaching from downwind could see and smell it a hundred miles off.

In due course *Atlantic* headed back for New York. A bad leak opened up off Cape Horn and the men were constantly at the pumps—a familiar story. Lawrence, in a manner typical of the fraternity of captains, showed little sympathy. 'There is not a sailor amongst them or a man that knows how to take hold of a sail in heavy weather. There is five of them on the sick list. They are all of them a poor worthless lot of beggars.' *Atlantic* reached New York after a passage of 103 days and turned out 911 tons of guano.[20]

Now let us look at two other ships whose activities illustrate the ramifying influence of guano and the agricultural roots connecting one hemisphere with another. The first ship never visited the Chinchas, although she was probably headed there on her ill-fated final voyage under the American flag. But she is of particular interest as an illustration of how vessels responded to changing demands and opportunities.

The ship *Robert Bowne,* 504 tons, was built in Stonington, Connecticut, in 1832. For the first ten years of her life she was in the coastal packet trade between New York and New Orleans and Mobile. In 1842 she was sold to a New London whaling firm and made two successful voyages to the Pacific. Then came the news of gold in California. *Robert Bowne* was reconverted to carrying passengers, although the smell of whale oil was still in her timbers, and made a tedious passage of 202 days in 1849 to San Francisco. During the next two years she shuttled twice between San Francisco and Sydney, Australia, and went to Oregon for lumber. At the end of 1851 she was purchased by Leslie Bryson, a resident of New Haven and a former captain in the coastal packet trade. Bryson and his ship went to Amoy for coolies, loaded 410, and headed back across the Pacific. There is considerable confusion about the destination. The vessel cleared for San Francisco, but it was common knowledge in Amoy and Peru that coolies were often tricked aboard ships by false promises of work in California. Several witnesses said this was the case with *Robert Bowne.*

Nine days out of Amoy conditions on board were bad and getting worse. Many coolies were sick; three had died. The first mate was sick and confined to his cabin.

20. Journals of Captain Joseph J. Lawrence, MSS collection 986, Sterling Memorial Library, Yale University.

Bryson decided that the sickness was related to the general filth and long pigtails of the Chinese. He ordered them stripped, scrubbed with stiff brooms, and shorn of their pigtails.

The Chinese did not like this treatment. They also were agitated by rumors that the ship was going to the Chinchas, not California. They rebelled. On 30 March 1852 they rushed Captain Bryson on the quarterdeck and hacked him to death with axes, killed five other officers and crew, and took possession of the ship. They ordered the surviving crew, none of whom knew navigation, to sail the ship to Formosa and when land was sighted to put the ship on the beach where most of them went ashore. The land was not Formosa, but one of the Ryukyu chain. Next the ship floated off on a high tide, the crew regained control, and managed to get back to Amoy.

There is much more to the story — an Anglo-American naval expedition to the Ryukyus where the Chinese were hunted down, some shot on the spot and others captured; a trial and acquittal by the Chinese survivors; unsuccessful efforts by Peter Parker, the American commissioner in China, to persuade Commodore Matthew Perry to make a naval demonstration against the Chinese (Perry had better things to do, namely the expedition to Japan); and the belated American and British recognition of the corruption and brutality of the coolie trade. But those things, fascinating as they are, need not be told in order to make the point that in *Robert Bowne* and in Leslie Bryson we have a ship and a sea captain drifting around the world until soil depletion and guano deposits drew them into a version of the slave trade which produced a bloody mutiny and Bryson's death.[21]

Our second ship led a placid, comfortably untroubled career typical of hundreds of general freight-carrying vessels under sail at the end of the nineteenth century. The ship *Devonshire,* a Biddeford-built downeaster of 643 tons, took on guano at the Chinchas in 1869. There were only small patches of the stuff left and it was gathered and loaded in bags rather than through the great chutes of the 1840's and 1850's. *Devonshire* made a routine, stormy passage to Hamburg where the guano earned $13,000 in freight.

In Hamburg Captain C. P. Sedgley obtained a charter

21. The information on *Robert Bowne* is summarized from the author's unpublished study entitled 'The Pigtail Mutiny' which in turn is based principally on American and British consular and diplomatic correspondence, naval records, and newspapers in New York, New Haven, San Francisco, London, Hong Kong, and Shanghai. The incident is briefly mentioned in Robert J. Schwendinger, 'Coolie Trade: The American Connection,' *Oceans,* XIV (1981), 38-44.

for Hong Kong with a miscellaneous cargo. *Devonshire* reached Hong Kong in March 1870. Here, incidentally, the Captain was foiled in his attempt to save money on provisions for the crew. He wrote to the owner, R. F. C. Hartley of Saco, Maine: 'When I left Hamburg I intended to get clear of my Dutch crew here and get a China crew if I remained in this trade and feed them on rice, consequently I only provisioned for six months, but I am not alowed to discharge a man here at present. The place being full of men.' He recalled that two years before in Hong Kong he had paid $15 for a barrel of beef. Now the price was over $30 a barrel and he had no choice but to pay.

Trade was dull in Hong Kong, so Sedgley went to Bangkok and loaded rice for Kobe, Japan—a country which in seventeen years since Perry's expedition had become a major food importer. In Kobe there were many ships waiting and nothing being offered. Without delay Sedgley and *Devonshire* sailed in ballast for San Francisco, arriving in September 1870 after a fast passage of 35 days. Thence with a full cargo of grain and flour for Liverpool, arriving in 120 days. Thence to Portsmouth, Virginia, with railroad rails for the tracks that were tapping America's farmlands. Next a short coastal haul to Philadelphia with railroad ties. Thence with molasses from that city, now the sugar-processing capital of the world, to Liverpool. Sedgley had hoped for a cargo of beef, but had lost the bidding to a steamer. Enough on *Devonshire*. But note how her wanderings in the space of two years took her around the world on seven long passages and two short ones most of them with commodities which were agricultural in origin or purpose: guano, rice, wheat, and molasses.[22]

Such examples of the maritime consequences of agricultural conditions could be multiplied indefinitely. We could look at the North American colonies in the seventeenth century and follow the very local movement of farm produce from farm to village. Almost every seaboard farmer was capable of navigating a small sloop or shallop, floating farm wagons, and many of them did. The occupational line between farmer and seamen was often nonexistent. We could look at the hay trade to the cities which reached a peak around 1900 and then disappeared thanks to Henry Ford and others. We could look at oranges, lemons, and bananas and at the maritime side of the process which made those fruits a part of everyday diet. We could look at the Great Lakes and the connections between the grain trade, ship design, canals and seaways, and international politics down to the recent imposition and lifting of an embargo on shipments to the Soviet Union. We could illustrate all of these with the particulars of real ships, real people, and actual voyages. In so doing we could spin some good fo'c'sle tales and at the same time illuminate broad themes of social, political, and economic change.

22. Letters of Captain C. P. Sedgley to Samuel Watts, Samuel Watts papers, collection 152, Mystic.

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Invented Too Late:

The Introduction of Steam to the Arctic Whaling Fleet*

By Robert Lloyd Webb

Our pumps were in good order
  The condenser it was clean
The pistons worked like magic
  And were well supplied with steam
We were all in good condition
  To face the northern jam. . . .[1]

THE appearance of steam auxiliary-powered whaleships caused scarcely an eastward glance among New England merchants when the British introduced such vessels in the 1850's. Steam power would not be adopted by American whaling entrepreneurs for another twenty years, and then would have little, if any, effect in slowing the decline of their already debilitated industry, although steam whaling would become a component of the dangerous but lucrative whaling grounds in the western Arctic Ocean. The difficulties attendant upon whaling in those northern waters suggested the potential of steam power to increase maneuverability and reduce risk among the ice floes, and the adaptation of whaleship design to accommodate such engines came about substantially in response to problems encountered in the bowhead whale fishery of the western Arctic, and, to a lesser extent, the whale fishery in Hudson Bay.

Prior to the development of steam engines for ships, the focus of technological innovation in the whaling business fell upon the whaleman's desire to improve his weaponry. Many patented inventions offered new ideas for distancing the hunter from his prey; the development of a successful harpoon-launcher became the goal of armorers. Whalemen adopted these various projectiles—including Pierce's darting gun, Roys's rocket-harpoon, the Brand gun, and the bomb-lance—with much more alacrity than other proposed improvements upon the whale fishery. Steam power was not so readily accepted; the introduction of auxiliary steamships in the British whaling fleet in 1857[2] attracted little attention. It took a special set of circumstances, and some sorry lessons, to convince Yankee financiers, captains, and crews that the 'tea kettles' they ridiculed might prove superior to sailing vessels in pursuing Leviathan in icebound waters.

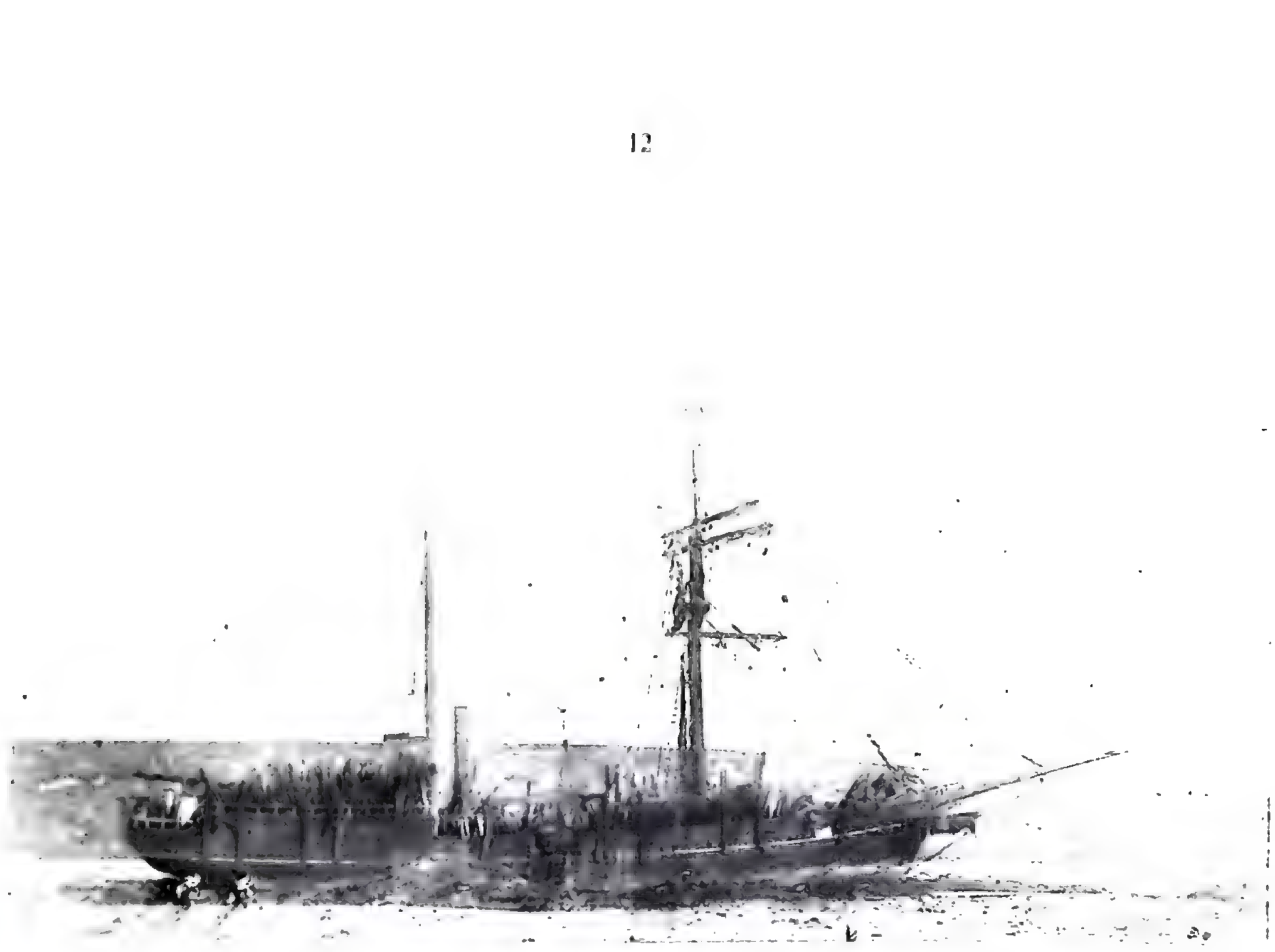
The three-masted, square-rigged sailing ship which searched for the whale in the Pacific Ocean was the most perfectly developed whaling platform ever devised. With its whaleboats slung on davits, a brick tryworks on deck for rendering oil, plenty of stowage for casks and a cooper aboard to assemble them as needed, such a vessel could remain at sea for long periods of time, cruising over the whaling grounds as long as weather and good hunting permitted. Adventurous captains, always on the lookout for unspoiled whaling, sailed these ships around Cape Horn beginning in the late 1780's, and found whales a-plenty in the Pacific and Indian oceans. In 1820, American and British whalemen reached the coast of Japan; by 1836 they had joined the French in the Gulf of Alaska. A hundred or more ships of several nationalities visited the 'North-West Coast of America' annually from 1842 to 1848, working northward from latitude 49° north to the Aleutian Islands.[3] There the right whale was slaughtered by the thousands, and a perfect annual cycle of whaling was soon established. Whalemen would cruise the North Pacific in the summer, reprovision in the Sandwich (Hawaiian) Islands, and spend the winter months on the coast of California or in the South Pacific, taking advantage of the reversal of seasons to hunt gray whales in the former locality, sperm and right whales in the latter. This cycle continued until a whaleship gathered a full cargo of oil and baleen—sometimes three or four years. Then, leaving the Pacific at last, the crew would sail the ship homeward bound to New Bedford, Nantucket, Stonington,

* This material was first developed for, and presented in part at, the Sail-to-Steam Symposium conducted by the Maryland Historical Society and the U.S. Frigate Constellation Museum in Baltimore, July 1982. Photographs courtesy of The Kendall Whaling Museum.

1. 'The Sealing Trip of the S.S. "Greenland" 1891,' in H.M. Mosdell (ed.), *Chafe's Sealing Book* (St. John's, Newfoundland: The Trade Printers & Publishers, 1923), p. 46.

2. Basil Lubbock, *The Arctic Whalers* (Glasgow: Brown, Son & Ferguson, 1955), p. 372.

3. Alexander Starbuck, *History of the American Whale Fishery: From Its Earliest Inception to the Year 1876* (New York: Argosy-Antiquarian, 1964), pp. 96-98.



Whaler *Jeanette* in the Arctic, 1899-1900

Sag Harbor, or some other port to offload its valuable contents.

As has always been the rule, if not the expectation, the grounds gave out in turn. Profits from the Northwest Coast declined sharply in 1846 and 1847, when a larger fleet returned less oil and less baleen than formerly. Whales there were becoming 'shy,' some said, 'wary of the boats.' Some were certain they had retired to as yet undiscovered grounds. Few correctly guessed that overfishing had depleted populations; fewer cared. There always seemed to be a new resort to be discovered by whalemen's enterprise. And in this case, there *was* one last ground.

In 1848, Thomas Welcome Roys, master of the bark *Superior* of Sag Harbor, New York, pressed through Bering Strait into the western Arctic Ocean. There he found a large population of 'Polar whales,' a relative of the right whale now known as the bowhead. Roys returned with a profitable cargo of baleen and oil, and told anyone who seemed interested that these 'new-fangled' whales were lethargic swimmers, easy to capture, big, and full of oil.[4] What was more, the baleen from their jaws measured incredible lengths — up to thirteen feet— and that soon made bowhead baleen the most desirable 'whalebone' in the marketplace.

A whaleship rush to the Arctic began the 1849 season. Almost every vessel outfitting for the Northwest Coast bypassed that depleted ground and sailed directly through Bering Strait as soon as the ice cleared. The weather continued fine, and the '49 season proved to be one of the strongest on record. Most of the whaleships in the western Arctic that year returned to the Sandwich Islands full, and word spread quickly that Arctic whaling was like nothing so much as a summer cruise with the family. The bowhead became the subject of an intense exploitation, and in just a few years the catch near Bering Strait, predictably, diminished rapidly. Captains were forced to push ever farther northward and eastward into icy seas; eventually a few that strayed too far, or stayed too long, were caught in rapidly building pack ice and treacherous currents, and their ships were lost.

Pack ice forms in the late summer, working its way near to the shores of both Alaska and Siberia. The sea can freeze as deeply as six inches in one night.[5] In the

4. 'New Cruising Ground for Whale Ships,' *The Friend* (Honolulu, 1 November 1848), p. 1.

5. John R. Bockstoce, *Steam Whaling in the Western Arctic* (New Bedford: Old Dartmouth Historical Society, 1977), p. 33.

middle of a brief and hectic whaling season ships commonly became imprisoned, drifting uncontrollably until the arrival of a warm snap which would release their hulls. This impairment became a source of uncertainty and concern for the men.

> This was the slowest getting anywhere I had ever experienced. On the 1st day of May we were 100 miles below Cape Navarin. A week later we were off the Cape. Then we pressed forward and went perhaps 50 miles, but only to be beset in the pack and remain 3 days without moving a ship's length, except as the current carried us. Then a northwesterly gale carried us back below Cape Thaddeus. Four or 5 days later the ice opened sufficiently to allow of making an attempt to work northward, and in 2 weeks we had only gone about 100 miles. During these 2 weeks we had sailed north and drifted south, sailed south and drifted north; in fact, gone in every direction. . . .[6]

Several catastrophic losses not only decimated the Arctic whaling fleet but made it apparent that a powered vessel might better suit the working conditions in the icy waters. In 1871, early ice trapped more than thirty whaleships near Point Belcher; all the crews survived by travelling more than eighty miles to a few ships that had managed to remain in open water, and this small flotilla carried them to the Sandwich Islands and to safety.[7] The losses sustained on account of the destruction of these hulls was further compounded by the disruption of most of a summer whaling season for those whalemen whose ships had survived. A similar disaster five years later claimed twelve whaling barks and ships, and fifty lives.[8]

Still, the whalemen made their way northward, and each year the advance in search of bowhead whales led vessels to ruin, and crews to death. In 1879, for example, the bark *Helen Mar* escaped destruction in the ice only by setting all sail in the face of a full gale, risking dismasting as an alternative to certain demolition among the floes.

> We could only steer with the sails, as the rudder was held solid by ice. The stem was a mass of solid ice even to the catheads, and around the ship at the water's edge was a regular platform of ice so that one could walk around the vessel.[9]

Whaler in the Arctic
Painting by William Bradford

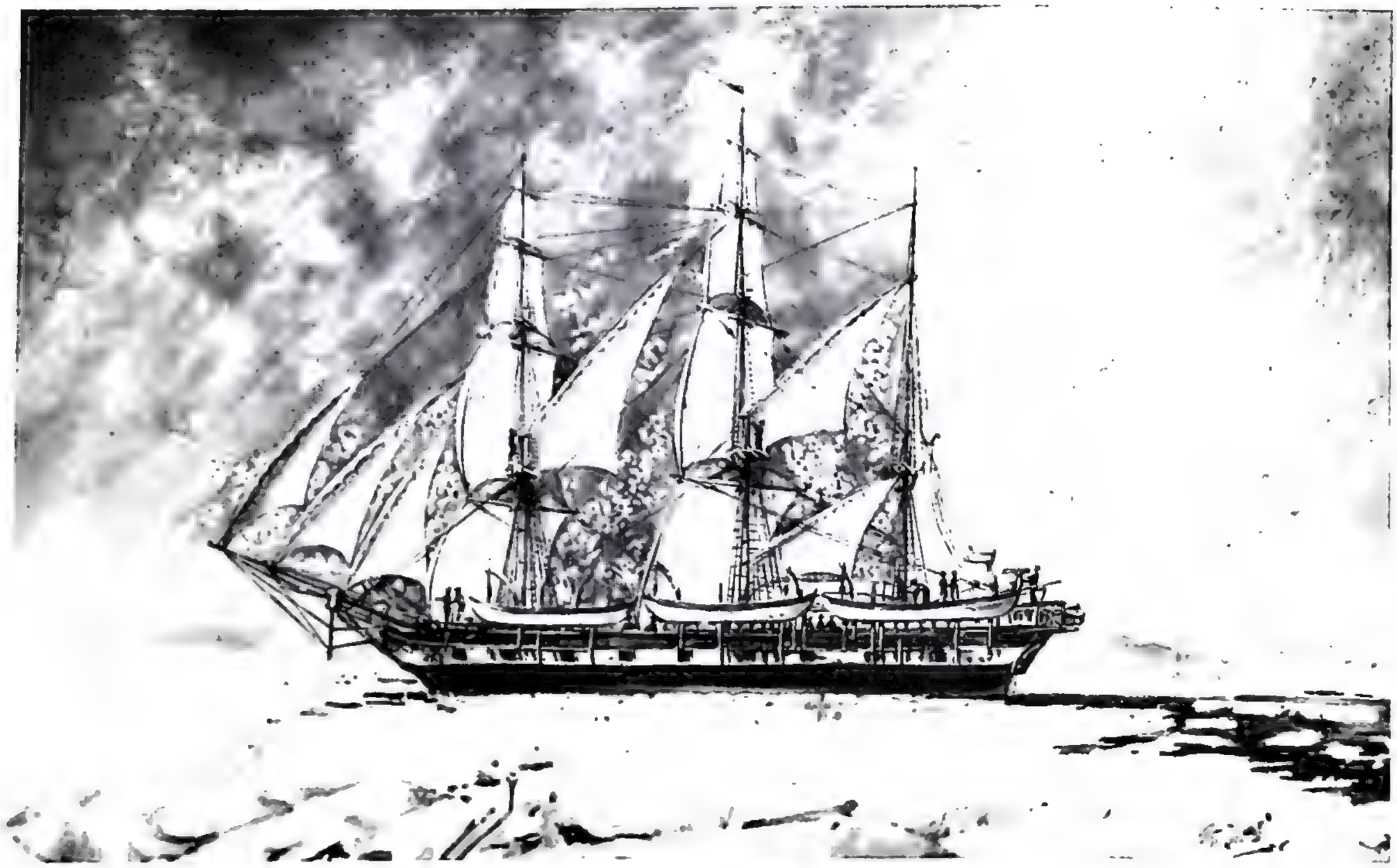
Even before the near loss of *Helen Mar,* an enterpris-

6. Herbert Aldrich, 'Arctic Alaska and Siberia,' *Outing* (November 1889); quoted in J. W. Collins, 'Report on the Fisheries of the Pacific Coast of the United States,' in U.S. Commission of Fish and Fisheries, *Report of the Commissioner for 1888* (Washington, D.C.: Government Printing Office, 1892), p. 80.

7. Elmo P. Hohman, *The American Whaleman: A Study of Life and Labor in the Whaling Industry* (New York: Longmans, Green, 1928), p. 293. A detailed discussion of these losses may be found in Starbuck, pp. 103-09.

8. Hohman, p. 295.

9. Herbert L. Aldrich, *Arctic Alaska and Siberia: or, Eight Months with the Arctic Whalemen* (Chicago: Rand, McNally, 1889), p. 224. The safe return of *Helen Mar* proved but a respite; in 1892 the bark was lost with all hands save one, in the ice of the western Arctic.



Whaler in the Arctic, circa 1900

ing New Bedford whaling agent named William Lewis decided to evaluate the steam-assisted British whaling fleet. He sent an experienced captain, Cyrus Manter, to examine Dundee-registered auxiliary steam whaling barks working off Newfoundland. Manter's favorable report led Lewis to invest in, and to cause others to buy shares in, the construction of a similar vessel. This auxiliary bark, *Mary & Helen,* was not the first American steam whaleship, having been preceded by *Pioneer* of New London, Connecticut, a former government transport which had been added to the whaling roster in 1855. Converted to steam ten years later, *Pioneer* made a successful trip to Davis Strait under sail and steam in 1866, collecting 350 barrels of whale oil and 5,000 pounds of baleen. Damaged in a gale the following season, *Pioneer* returned to port after but a month at sea; repaired and reprovisioned, the crew set out to the northward as before, only to be jammed in the ice of Hudson Bay and sunk, nothing saved but the men and the boats.[10]

Lewis's *Mary & Helen,* built by Goss, Sawyer, and Packard in Bath, Maine, was specially designed from the keel up to withstand the rigors of the western Arctic. Costing $65,000, the new bark was toughly constructed of hard oak and equipped with a one-cylinder steam engine and boilers designed by George H. Reynolds. Reynolds had designed the powerplant for *Pioneer,* and previously had assisted in the installation of steam in the United States ironclad warship *Monitor.*[11]

Following the launching, on 30 July 1879, *Mary & Helen* was taken to New Bedford for outfitting, and then sailed around Cape Horn for the Sandwich Islands. There, Captain Leander Owen joined the steam bark for the northward voyage. Owen was a veteran Arctic whaleman, and under his guidance the crew brought back 2,350 barrels of whale oil and 45,000 pounds of baleen taken from twenty-seven bowhead whales—a $100,000 catch which completely repaid Lewis and his fellow investors.[12] Although sold soon after to become the government search and rescue vessel *Rodgers, Mary & Helen* provided prompt affirmation of the potential of steam power in the Arctic whale fishery.

Without waiting for the return of his first steamer, Lewis financed the construction of two more such ves-

10. Dennis Wood Abstracts, vol. 4, p. 317.

11. Bockstoce, *Steam Whaling,* p. 22.

12. Bockstoce, *Steam Whaling,* pp. 22-23.

sels, *Belvedere* and *North Star*. Another was begun soon after, and would inherit the name formerly belonging to the U.S.S. *Rodgers*. *North Star* drew the unlucky lot; despite the proclaimed superiority of steam power in the ice, *North Star*—like *Pioneer* before—was crushed among the floes, and did not return from its maiden voyage. *Belvedere* and *Mary & Helen (2d)*, however, were to serve relatively lengthy careers in the north.

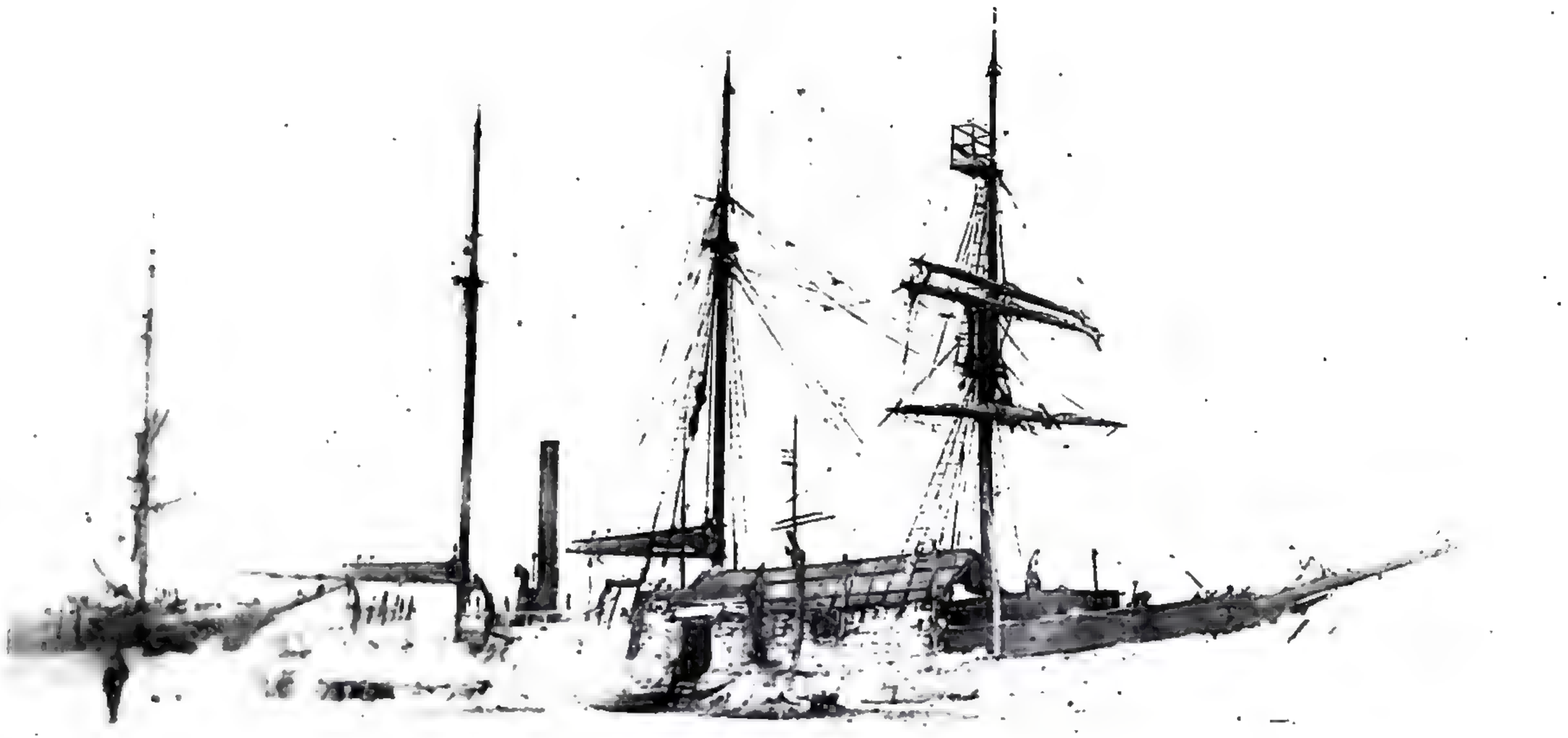
Whaleship passing Dumplin Rocks, South Dartmouth, Massachusetts
Painting by C. F. Raleigh

Lewis's first returns earned the attention of financiers in San Francisco. By this time a variety of circumstances had combined to make that west coast port the major outfitting place of American whaling vessels. The development of outfitting services and supply houses, increased wharfage, a connection to the new transcontinental railroad—which had been completed in 1869—and the growing importance of the western Arctic whaling grounds, had made New England merchants conscious of the savings to be effected by leaving their vessels in the Pacific. It was no longer necessary to return oil and men by way of Cape Horn; whaleships might now sail the 2,900 miles from San Francisco to the Bering Strait, and return at the end of the summer with cargoes of whalebone and oil for transport by rail to the east, or, after the mid-1880's, for refining at local plants. Honolulu and Lahaina, once the major reprovisioning and transshipment ports for Pacific whaleships, were gradually abandoned as the remaining trade became centralized inside the Golden Gate. Savings in time and costs were substantial, and the Pacific whaling voyage quickly ceased to be a three- or four-year proposition. Ships sailed in November or December, or in the early spring, perhaps whaling in the Gulf of Alaska before passing through Bering Strait just after the Fourth of July. After summering in the Arctic, their crews would turn southward toward San Francisco when fog, rain, and ice again obscured the Arctic and North Pacific oceans.

The first voyages of San Francisco-registered whaleships may have been those of *Nile* and *Russell*, in 1851.[13] New Bedford that same year sent 135 whaling vessels to the world's oceans, including a fair number to the North Pacific.[14] Thirty-five years later, in 1888, 28 whaleships would legally call San Francisco home—8 of these the new auxiliary steamers. New Bedford, by contrast, would send only 17 vessels that year, a number of these being small schooners bound for the Atlantic grounds. In addi-

13. Starbuck, pp. 490-91. Starbuck admitted difficulty in validating returns of vessels to San Francisco during the early 1850's; certainly the influx of men and vessels attendant upon the gold rush caused recordkeeping problems of all kinds.

14. Starbuck, pp. 476-83.



Whalers *Newport* and *Narwhal* in the Arctic in 1891-1892

tion, the larger fleet of New Bedford-registered whaleships in the Pacific, which then numbered 3 steamers, 24 barks, 2 ships, and 1 brig, made its rendezvous at San Francisco and considered that port its final destination, refitting there after each Arctic voyage without returning to New England by way of 'Cape Stiff.' The 58 whaleships utilizing the facilities in San Francisco Bay thus doubled the number which appear in the San Francisco ship registries. Among the sailing barks registered in New Bedford, but working from San Francisco, that year, were the veterans *Charles W. Morgan, Lagoda, Cape Horn Pigeon, Andrew Hicks,* and *Young Phoenix.*[15]

A San Francisco-based investment consortium which included George Clement Perkins, governor-elect of the State of California, and shipping magnate Charles Goodall, contracted with the local Dickie Brothers shipyard to build a steam whaler on the general plan of Lewis's *Mary & Helen.* This bark, *Bowhead,* was launched in 1881 and promised immediate success. The Dickie Brothers managed to complete three more steam whalers for the same consortium, and in record time; so quickly were they launched and outfitted that all three—*Orca, Balaena,* and *Narwhal*—sailed from San Francisco on their maiden voyages in 1883. The consortium had by this time purchased *Mary & Helen (2d)* from Lewis, and sent it to the Arctic the same year. Perkins and Goodall incorporated in 1885 as the Pacific Steam Whaling Company. Capitalized to $2 million, investors could purchase shares of company stock rather than investing in a voyage of an individual vessel, as had been the custom among New England financiers.

The growing number of steam whaleships among the San Francisco fleet combined the best features of a fully rigged sailing vessel with the modern steamship. With mechanical power, their hulls could push through 'young ice,' scattering ice, and thin pack ice that would stop a sailer; a steamer's master might proceed through the floes to chase an escaping whale, or to look for animals seeking safety in the ice pack. A sailing rig was obliged to remain along the perimeter of the ice, its crew always watchful for a shift in wind or a falling barometer that might forecast entrapment. Perhaps more importantly, 'donkey-engines' were available in the steamers to assist men in the regularly gruelling tasks of raising anchor and sail, wearing ship, and hoisting huge slabs of blubber on deck for the 'trying-out.' These steam donkeys helped make shorter work of what had formerly been a sweated manual job in sailing ships.[16]

The donkey-engines also helped in the ice. 'Steam was got up in the donkey-engine,' one chronicleer reported,

15. Collins, pp. 89-90.

16. By the 1880's many of the Arctic sailing barks were also equipped with a donkey-engine for deck work, and an engineer to run it. The engineer received perhaps $10 per month, plus a 1/100th lay; see Collins, p. 77.

"and by running lines to large cakes of ice in our path, then pulling ourselves along with the [steam-assisted] windlass, we soon emerged into the clear water. . . .'[17] There were other ingenious uses for steam. Aboard *Belvedere,* in unusually warm spring weather in 1907, the mate wrote: 'Noon Thu 40° very warm got cask on deck filled It with snow and they Melt It With Steam for wash water. . . .'[18] And at least one steam whaler, *Bowhead,* was equipped with steam heat in the sailors' forecastle,[19] a true upgrade in the terribly difficult living conditions of the whalemen before the mast.

Another writer implied that steam power directly influenced the methodology of the hunt. 'The bells sounded in the engine room for full speed ahead,' he wrote, 'for it was the steamer's duty now to get between the boat that was fast to the whale and the ice. Thus, with the noise the propeller makes we turn the whale away from the ice.'[20] This ploy sometimes worked to a disadvantage, as one captain reported: 'Light westerly winds prevailed on the 30th and we then lowered for several whales, but the *Beluga* came driving along under steam and frightened our much desired quarry into precipitate flight.'[21]

Steam presented other real drawbacks. First, the cost of outfitting a steamer was three to five times that amount required to outfit a sailing bark of similar size. The steamer had to be more sturdily constructed, to handle both the powerplant and the tough service for which the vessel was intended. Ironwood (lignum vitae), used for outer sheathing of the hull, cost $90 per thousand feet at the end of the century, 'a tremendous price to pay for lumber of any kind then. . . .'[22] And as none of these steamers was any more than auxiliary-powered, each carried also a full suit of canvas, usually sent aloft on three conventional masts in bark rig: fore and mainmasts square-rigged, the mizzen mast 'fore-and-aft.' No savings could be effected by reducing the sail plan, for steam power was still in its infancy—always gluttonous for fuel, and at least occasionally unreliable, especially when poorly maintained.

17. Aldrich, *Arctic Alaska and Siberia,* p. 40.

18. Log of the whaling steamer *Belvedere,* 20 March 1907 to 8 October 1907: Kendall Whaling Museum (29); 9 April 1907.

19. Lloyd C. M. Hare, *Salted Tories: The Story of the Whaling Fleets of San Francisco* (Mystic: The Marine Historical Association, 1960), p. 66.

20. John A. Cook, *Pursuing the Whale: A Quarter-Century of Whaling in the Arctic* (Boston: Houghton Mifflin, 1926), p. 52.

21. John A. Cook and Samson S. Pederson, *'Thar She Blows': Experiences of Many Voyages Chasing Whales in the Arctic* (Boston: Chapman and Grimes, 1937), p. 246.

22. Hartson H. Bodfish, *Chasing the Bowhead* (Cambridge: Harvard University Press, 1936), p. 41.

Everything was going along fine until we were taking the [whale's] head aboard. It was quite a large head and the engine was working real hard. We had a roaring fire going and the safety valve tied down, when suddenly there was an explosion and 'tween decks was filled with steam. When the steam had cleared away we found the main steam pipe had let go. We didn't have any pipe to make repairs, so that was the end of the donkey engine as far as we were concerned.[23]

Additionally, steam boilers used coal for fuel, at $6 to $10 per ton in the 1890's,[24] and the space required by this coal necessarily reduced the whaleship's capacity for its merchantable cargo of baleen and oil. Crew lists grew longer, too; the powerplant required the services of a chief engineer, an assistant engineer and, often, two firemen. When the sailing bark *Young Phoenix* cleared the Golden Gate in 1887, for example, twelve officers had been signed on—including the master, four mates, a boatheader, three boatsteerers, a steward, cook, and carpenter (who doubled as cooper). The steam-auxiliary bark *Belvedere* that same season carried a master, five mates, a boatheader, four boatsteerers, steward, cook, cooper, chief engineer, assistant engineer, two firemen, and a carpenter; nineteen men plus the "crowd" forward.[25] These were more mouths to feed during the whaling season and more hands to pay when it was done. Mitigating this, however, was the common belief that the steamer would make a larger catch owing to its increased ability to hunt in the ice.

And there were social side effects, as well. The mechanical crew did not engage in the whaling, and earned a fixed wage rather than the traditional 'lay'—a percentage of the profits of a voyage based on a man's standing and experience. Jenkins[26] reported that chief engineers in 1897 earned $125 per month; assistant engineers were paid $90. In some cases the engineers received a salary plus a portion of the proceeds, even though they did little or no whaling; Collins[27] indicated that, in the late 1880's, first engineers received $50 per month, plus 1/50th lay; second engineers earned $25 monthly plus a 1/100th lay, while firemen were paid a 1/125th per-

23. Reginald B. Hegarty, *The Rope's End* (Boston: Houghton Mifflin, 1965), p. 105.

24. J. T. Jenkins, *A History of the Whale Fisheries: From the Basque Fisheries of the Tenth Century to the Hunting of the Finner Whale at the Present Date* (London: H. F. & G. Witherby, 1921), p. 249.

25. *List of Officers Composing Whaling Fleet: 1887* (San Francisco, James Laflin, [1887]), pp. 10, 26.

26. Jenkins, p. 248.

27. Collins, p. 77.

centage only.[28] It is likely that the conservatism of sailors, which translated as a strict prejudice against engineers and firemen, carried over from other steamships to the whaling business, where these few non-whalemen earned predictable sums for tending a machine, while the 'sailors' were forced to pursue a life-threatening existence for what was more and more frequently becoming a small and uncertain payoff. Worse, the steam engine seemed little more than a simple contraption. No doubt many of the regular shellbacks, so accustomed to self-sufficiency, considered themselves equal to any mechanical device—without the need for 'specialists.' And it was true enough that some of the early low-pressure steam engines were, indeed, basic contraptions:

> . . . There's not much to strain your intellect over the engine here. There's just one simple low pressure, that was built in the year one, and never improved since. You have to stand-by to hand-lever her over the dead centre when she stops, and the boiler blows off at nineteen pounds. I've burst a steam-pipe already, and served it with kanptulicon off the pantry floor, and spun'y'n. It seems the usual habit, judging from past repairs.[29]

The economic requirements of steam caused owners and agents to retain the sailing barks in the western Arctic, despite the opinions of some experienced men that steam gave whalemen a clear advantage. On 7 September 1905, toward the close of the Arctic whaling era, W. F. Joseph, master of the sailing bark *California,* wrote: 'No whales upp [sic] to date . . . Man is a d—n fool to Come Here in a Sailing ship. . . .'[30] When whales were finally sighted, Captain Joseph could not reach them. On 12 September he wrote: '. . . saw 2 Whale in the young Ice ship could not go through it.'[31] The following year, Joseph shipped in a steam whaleship as first mate, perhaps accepting a demotion rather than take another sailing vessel to the polar seas.

In retrospect, the steam whaler proved nearly as vulnerable to the ice as did its sailing counterpart. Not only was *North Star* destroyed on its first trip, but other steamers regularly fell prey to the incessant demands to push ever farther into the Arctic. *Bowhead* was holed by ice and sank near Icy Cape in 1884, its crew rescued by Dickie Brothers sister ships *Balaena* and *Narwhal.* The fourth sister, *Orca,* was lost in 1897 while trying to escape rapidly forming ice by the Sea Horse Islands. And *Grampus,* a refitted United States revenue cutter owned by the Pacific Steam Whaling Company, was condemned at Point Barrow in 1901 after being severely damaged by ice.[32]

As the steamers pushed tentatively northward and eastward from Point Barrow, their crews exploited newly discovered areas of bowhead activity, culminating in 1888 with the discovery of summer feeding grounds at the mouth of the Mackenzie River. Coupled with this find was the establishment of a relatively safe wintering area suitable for whaleships, at Pauline Cove on Herschel Island. Beginning in the early 1890's whaling steamers were outfitted for a year, their masters instructed to remain in the north rather than return when ice began to form. Walrus and seal hunting augmented the whaling, and trade with the native Eskimo for furs and food—including ptarmigan, caribou, and mountain sheep—became an important part of the repertory of the Arctic whaleman. By 1897 Herschel boasted an Anglican mission, several social societies—with restricted memberships—and a general store which also served for makeshift minstrel shows and other amusements. Beginning in the winter of 1894-1895 women were present, a few hardy wives of captains and other family who made the trek northward in the whaleships. An Eskimo-inspired method of wintering the vessels was evolved; houses were built on deck and the entire hull would be banked with snow in the manner of an igloo, as protection against the cold.

Wintering-over was an extension of the profit motivation of owners, a financial decision to place men and women at risk in the remote Arctic in order to have whaling crews on the grounds at break-up the following summer. At first this led to larger catches and bigger profits; one of the smallest auxiliary steamers, the Oregon-built *Mary D. Hume,* amassed a fortune in 1890-1891 on the value of baleen alone, as she carried no tryworks. The crew of this 'bone-hunter' took thirty-seven bowhead whales at the Mackenzie Delta and brought to San Francisco in 1892 a cargo worth $400,000, which Arctic whaling historian John Bockstoce has called one of the most productive voyages in the history of the American whale fishery.[33]

28. By this time, a lay was often calculated on a valuation fixed by the owners before sailing, with the result that the crew often received about half the real value of the cargo on return to port, because of the increased valuation of the oil and bone over time.

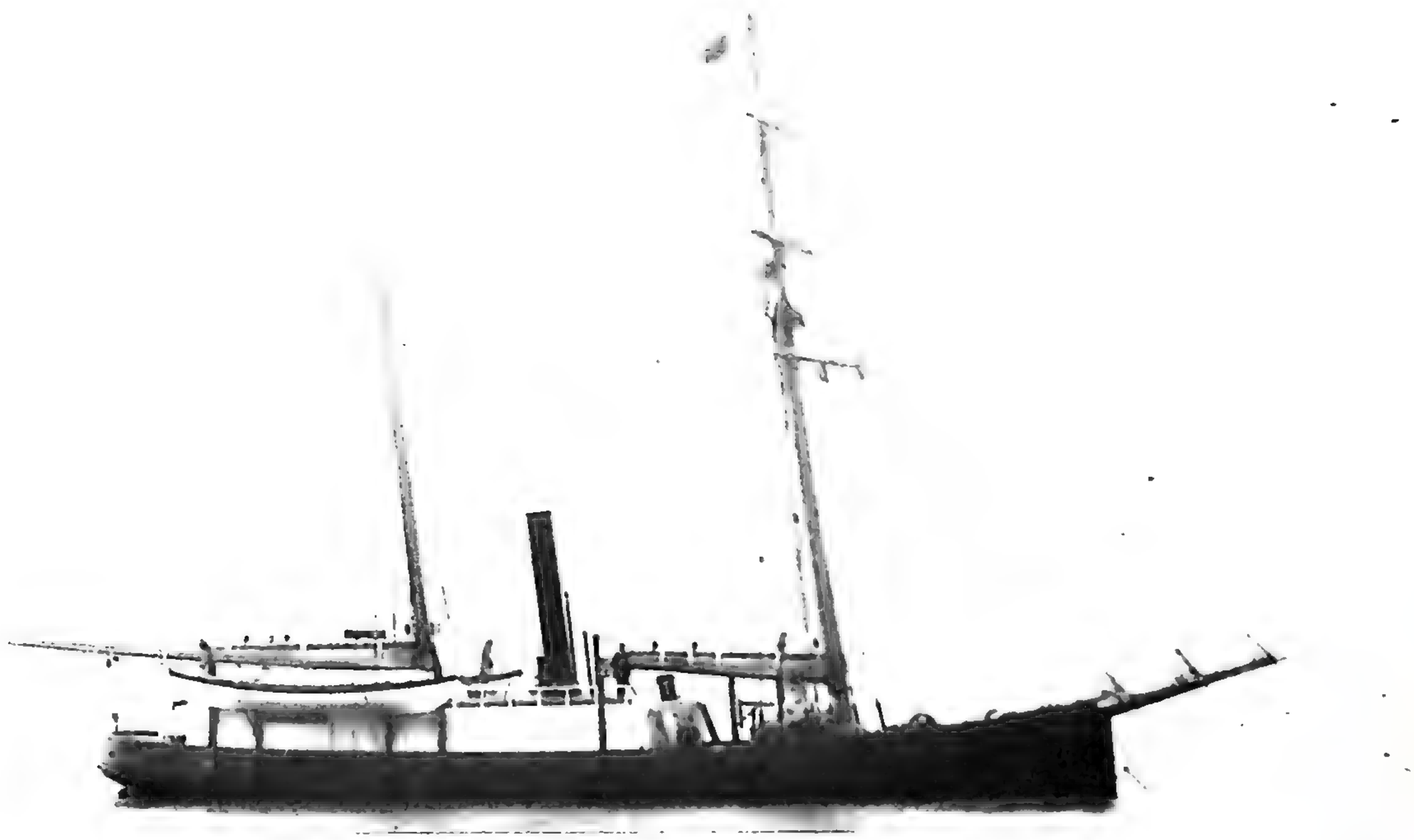
29. Cutcliffe Hyne, *McTodd* (New York: Macmillan, 1903), p. 151.

30. Log of the bark *California,* W. F. Joseph, master and log-keeper, 16 February 1905 to 9 November 1905: Kendall Whaling Museum (40), 7 September 1905.

31. *California,* 12 September 1905.

32. Bockstoce, *Steam Whaling,* pp. 77-99.

33. John Bockstoce, 'History of Commercial Whaling in Arctic Alaska,' *Alaska Geographic,* 5 (1978), p. 25.



Steam Whaler *Mary D. Hume* at anchor

The availability of steam power played a large part in making such winterings practicable. But the advantages of steam in this regard were surely lost on the men, who were hardened by the harsh conditions, the boredom of a long winter beset in the ice, and the daily risk inherent in their work. Shipboard conditions sometimes led to near mutiny and other disaffiliations. Captain Hartson Bodfish, master of the converted steam bark *William Baylies,* placed one of his boatsteerers in irons during the 1906 season, with disastrous results. The mate's logbook reports the boatsteerer 'in fore Hold and in Irons' on 5 May, and 'in Irons Crazy' the following day.[34] Bodfish's later, published account suggests that the man was 'eating heartily all the time,' and that he 'appeared quite friendly to me, but . . . expressed dislike for a couple of the officers and threatened to get them.'[35]

On 11 May the captain put the boatsteerer in the fire room, 'chained to [a] Stanchion'[36] and there he died. When *Baylies* reached Wainwright Inlet in early August the United States cutter *Thetis* was there. Captain Hamlet had the power of a United States Commissioner, and he sent a crew who 'came on board and took some of the Men . . . to Hold Investigation about the death. . . .'[37] More inquiry was conducted the following day, and a second boat crew from *Thetis* 'took Capt Bodfish R. H. Butler Chas. Christian R. Ferguson Thom McDermott Bag and Baggage. . . .'[38] Bodfish was cordially detained aboard the cutter, and command of *William Baylies* passed to the first mate. For the remainder of the season the captain was allowed to assist in the whaling but was not permitted to remain aboard, as he was nominally in custody for manslaughter, pending an appearance before a federal grand jury. Bodfish's was not a singular case; John A. Cook, master of *Bowhead (2d)* later wrote, 'Endless complaints were made by our crew to the captain of the Thetis. . . . Whalemen were in bad repute, as then there were two captains aboard the Thetis who had been taken from their ships, to be tried in United States courts on charges preferred by their crews.'[39]

At the conclusion of the whaling season both *Baylies*

34. Log of the steam bark *William Baylies,* W. F. Joseph, first mate and logkeeper, 10 March 1906 to 7 November 1906: Kendall Whaling Museum (40), 5-6 May 1906.

35. Bodfish, p. 233.

36. *William Baylies,* 11 May 1906.

37. *William Baylies,* 5 August 1906.

38. *William Baylies,* 6 August 1906.

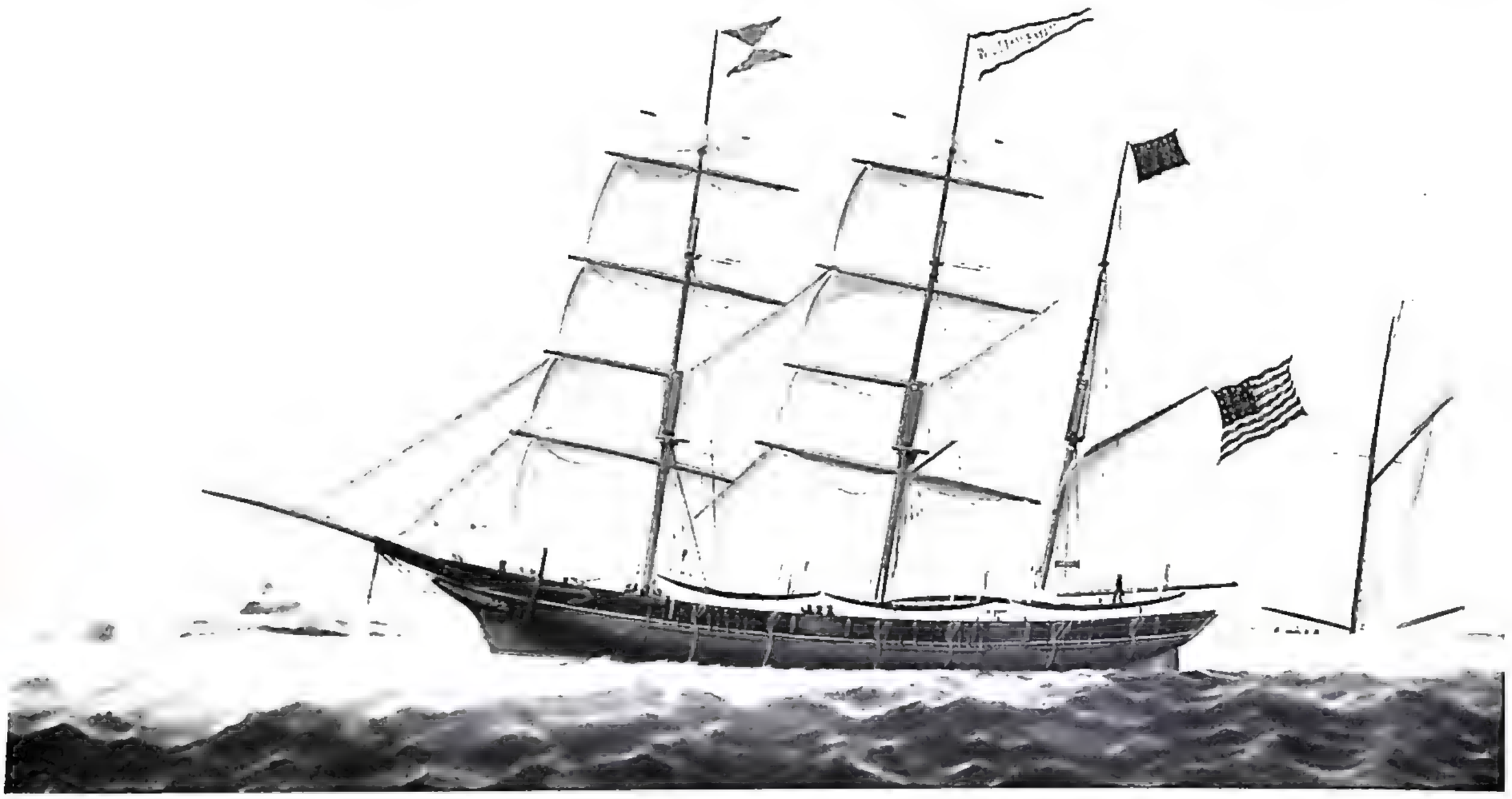
39. Cook, *Pursuing the Whale,* p. 329.

and *Thetis* proceeded to Nome, where the customs officer there refused permission for anyone to board the whaleship without his authorization. After much legal wrangling, Bodfish was allowed to sail his bark to San Francisco,[40] and when court convened in Seattle a dozen of his men made the trip north to testify in his defense.[41] He was acquitted of all charges, and subsequently laid blame at the door of the Industrial Workers of the World—the 'Wobblies'—a radicalized labor organization which he believed had forged a letter accusing him of shanghaiing men and fatally mistreating the boatsteerer.[42]

The effects of a diminishing market and a fishery beset by trouble of all sorts drove the price of baleen to an astonishing seven dollars per pound. The oil market had long before collapsed—in 1897 a gallon of whale oil fetched thirty cents,[43] far below the sixty-five cents per gallon price which it had commanded in the 1870's.[44]

40. *William Baylies*, 11 October 1906.
41. Bodfish, pp. 242-43.
42. Bodfish, p. 234.
43. Hohman, p. 307.
44. Starbuck, pp. 660-61; sperm oil always commanded a higher price than 'whale oil' derived from baleen-bearing species. These figures reflect whale oil prices only.

Josiah Knowles, director of the Pacific Steam Whaling Company, had gone so far as to instruct the company's masters to 'take no oil, nothing but whalebone.'[45] admonishing them not to use valuable time to 'spade out fat.'[46] Sometimes the head of a bowhead whale would be taken aboard, and the rest towed to shore for use by local Eskimo. Baleen alone supported the industry, and so supported it quite literally, since its major applications were now for stays in collars and corsets, and for the hoops of the faddish new multiple-layer skirts that were the latest in women's fashion.



Whaleship passing Dumplin Rocks, South Dartmouth, Massachusetts
Painting by C. F. Raleigh

The price of baleen allowed other materials to become economically competitive. In 1907 the availability of spring steel caused a collapse in the whalebone market; prices fell nearly 75 percent in one season.[47] Owners combatted losses by sending smaller vessels and fewer men; schooners began to appear in the western Arctic, where nothing less than a three-masted, square-rigged vessel had formerly seemed appropriate. But whereas the steam bark *William Baylies* had in 1906 required seven-

45. Bockstoce, *Steam Whaling*, p. 37.
46. Bockstoce, *Steam Whaling*, p. 37.
47. Bockstoce, 'History,' p. 25.

teen officers and twenty-seven men, the gasoline-auxiliary schooner *Monterey* that same year employed only twelve officers—including the requisite chief engineer and assistant engineer—and a reduced complement forward.[48] It became impossible for would-be financiers to raise support for the construction of any new whaleship, particularly an expensive auxiliary steamer. In 1898, when American interests purchased the 27-year-old Norwegian steam whaler *Haardraada,* a congressional bill was required to overturn prohibitions on the registration of foreign-built hulls. The owners argued effectively that

> Eight years have elapsed since the construction of a vessel for [whaling], for it is so difficult to get the right material, and the cost of construction is so high, the ship-builders are not seeking whaleship contracts today. The whaling industry is declining . . . the people who are engaged in outfitting at the present time will never be disposed, or have occasion, to build another vessel for Arctic whaling.[49]

When the re-registration was authorized, *Bowhead (2d)* raised the Stars and Stripes to become the last American auxiliary steam whaleship. In the twentieth century, whale hunters would shift their focus to the humpbacks, finbacks, and blue whales, chased from sailless, steam-powered craft equipped with harpoon-cannon, exploding harpoon heads, and air compressors to float the carcasses after the kill. In the Pacific Northwest and Alaska these chaser boats would be most often attached to shore stations, and this shore whaling would take place only on a limited scale, and not always financed by American money. With the collapse of the baleen market there were few Americans willing to invest in the new whaling technology; the economy had shifted to petroleum-, vegetable-, and mineral-based industries, and even New Bedford—the premier American whaling port—had long since moved its venture capital into manufacturing, textiles, and the extraction of land-borne riches from the American West. Vessels belonging to New Bedford cleared San Francisco and began the long voyage homeward; *Charles W. Morgan* returned in June 1906 after a 20-year absence. *Andrew Hicks* returned also, in 1908, after an equally long time out of the Atlantic Ocean. Others, like *Lagoda, Cape Horn Pigeon,* and *Young Phoenix* finished their careers in the Pacific—lost, or condemned on foreign shores.

A brief resurgence in the whale oil market during World War I sparked an equally brief renewal of interest in the craft of whaling, but this was clearly a dying sputter from the old lamps; the industry had been virtually extinguished. The steam whalers that had not already fallen victim to the Arctic ice lived out their days in various services, without replacements to follow them northward. *Mary & Helen (2d)* was sunk by a German raider in 1917 while transporting gasoline and benzine to Australia. *Belvedere* was crushed in the ice near Cape Szerde Kamen, Siberia, two years later, while freighting. *Bowhead (2d)* (ex-*Haardraada*) served ignobly as a target for torpedoes in a 1915 motion picture. Refusing to sink, the hulk was towed to the California shoreline and there burned. Only the famous steam brigantine *Mary D. Hume*—all 98 feet in length—survived. Rebuilt as a towboat, *Hume* remained active on Puget Sound in the Pacific Northwest until 1978.[50]

Of the rest, they were almost all surrendered to the ice: Lewis's *North Star,* on its maiden voyage, 'ground fine as matches';[51] his namesake steamer *William Lewis* run aground at Point Barrow in 1891 and burned accidentally by salvors the following year; and the converted steam bark *William Baylies*—Bodfish's troublesome command—lost at Plover Bay, Siberia, in May 1908, sandwiched between pack ice and the shore and its bottom torn out;[52] all gone, bowheads, the whalemen who hunted them, and the strange, transitory vessels which combined square sails and steam engines to push the American whale fishery to its last, inevitable whaling ground.

48. *List of Officers Composing Whaling Fleet: 1906* (San Francisco: James Claflin, [1906]), pp. 14, 17.

49. Cook and Pederson, *'Thar She Blows,'* p. 162.

50. *Mary D. Hume* is preserved by the Curry County Historical Society in southern Oregon.

51. Frank Reynolds, noted in Bockstoce, *Steam Whaling,* p. 85. Reynolds, the engineer aboard *North Star,* was related to George H. Reynolds, who had designed powerplants for the first American steam whaleships, *Pioneer* and *Mary & Helen.*

52. Kenneth R. Martin, *Whalemen and Whaleships of Maine* (Bath: Marine Research Society, 1975), p. 52.

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The Adventures of Two Women Whalers

By Suzanne J. Stark

With pitch and tar her hands were hard,
though once like velvet soft.
She weighed the anchor, heaved the lead,
and boldly went aloft.
For one and thirty months she braved
the tempests, we are told,
And always done her duty, did the female
sailor bold.

—from a nineteenth-century American ballad

THE most unbelievable sea yarns about women disguised as men serving in sailing ships, are those of two women who worked in the crews of whaling vessels. Both stories were long dismissed by maritime historians as preposterous, for, in addition to the problems a woman would have maintaining a male disguise in the crowded quarters of a whaler, she would have had to be able to pull the heavy oar of a whaleboat hour after hour, often in boisterous seas, and although women's bodies are stronger in some ways than are men's, the muscles of the shoulders and upper arms of most women are not well developed. It would be most difficult for a woman to perform well in a whaleboat.

Unlikely as it would seem, however, there is documented evidence that two women served in the crews of American whaling vessels in the mid-nineteenth century, and managed to do their share of the rowing in whale chases.

In the earlier case, neither the woman's real name nor her assumed male name is known. She sailed in the whaling ship *Christopher Mitchell,* under the command of Captain Thomas Sullivan, in 1848. She was dressed in men's clothes when she signed on at a shipping office in New York City, and was sent on to New Bedford and across to the island of Nantucket where *Christopher Mitchell* lay waiting to gather a crew. The woman said she was from a town on the Hudson River in upstate New York.

The ship sailed on 9 December 1848, and the young female greenhorn learned the ropes in the storm-tossed winter of the North Atlantic. As *Christopher Mitchell* worked her way south and into warmer weather off the east coast of South America, the sailors may have wondered why one young crew member never removed his shirt, and why he was so modest in his toilet habits, but, apparently, they accepted the woman's modesty as that of a shy young farm lad.

Christopher Mitchell made the treacherous rounding of Cape Horn without mishap and continued up the west coast of South America to the whaling grounds off the coast of Peru. There the young woman was stricken with a severe fever and was confined to her berth. In the steamy, badly ventilated forecastle, her temperature rose and she became delirious. She threw off her shirt and struggled out of the heavy canvas that she bound around her breasts. A shipmate, glancing into her berth, was dumbfounded to realize that he was looking at the body of a young woman. He bounded up to the deck and shouted the news to the officer on duty. The officer roused Captain Sullivan who rushed below to confirm the situation and, having done so, immediately ordered that the young woman be carried to the officers' quarters until she could be sent ashore.

It was on 4 July 1849 that Captain Sullivan learned that there was a woman in his crew. She had served at sea for seven months.

Her story was soon passed on to the other whaling vessels cruising the area, and several sailors later wrote about the woman in their reminiscences. The story was also picked up by New England newspapers when *Christopher Mitchell* returned to Nantucket in 1852. However, the log of the voyage was not preserved, and there seemed no way for modern-day historians to confirm the story. But recently, evidence that the woman did work in *Mitchell* for seven months has come to light. The confirmation was found among a packet of consular dispatches in Washington, D.C.

Not long after Captain Sullivan found the woman in his crew, he put into the port of Payta, Peru, and handed the woman over to the American consul, Mr. A. Ruden. (Presumably, by this time she had recovered from her bout of fever.) Consuls were expected to offer aid to distressed seamen, and Captain Sullivan expected Ruden to send the woman back to the States at government expense. Ruden, however, refused to send the woman home unless Captain Sullivan paid for all the expenses

involved. He presented the captain with the following bill totaling $236.25:

Woman's clothing—$84.00
Room and board in Payta—$19.00
Passage to the United States—$100.00
Traveling expenses—$20.00
Postage—$2.00
Commission to A. Ruden—$11.25

The captain particularly resented paying a commission to Ruden, and paying the large sum of $19.00 for the woman's food and lodging, since she had stayed in Ruden's household. After a heated argument, Captain Sullivan agreed to pay Ruden, but assured the consul his ship's owners would pursue the matter.

The shipowners did indeed protest the bill, and carried the protest all the way up to John M. Clayton, Secretary of State, in a letter dated 22 September 1849, but records do not indicate if they were ever reimbursed. Nor is anything further known about the young woman herself.

Many more details are known about the second female 'whaleman.' She signed on the small bark *America,* under the command of Captain John A. Luce, in the fall of 1862. This young woman used the name George Weldon.

Captain Luce, preparing to set out on his third voyage in *America,* was having a difficult time finding a crew. The Civil War was on, and men not serving in the Union armed forces could get jobs in New England factories turning out war supplies at far better wages than whalers paid, and they were a lot safer there than in a berth in a small and aging whaling bark. The always perilous occupation of whaling was now even more hazardous with Confederate raiders capturing and burning every Yankee vessel they could track down. Even a landsman could figure out that the forty-four-year-old *America,* only 288 tons, would have little chance against a swift Rebel warship.

A ship's agent in Boston signed Weldon to go in *America* and considered it lucky to find such a promising recruit. Weldon stood five feet nine inches, weighed 175 pounds, and appeared to be about twenty. He had very pale skin, curly blond hair, and a sturdy physique. A newly healed scar ran across his cheek. Weldon said that he was from Maryland and that he had served in the Confederate cavalry. After receiving a severe cut on his cheek during hand-to-hand combat, he was taken prisoner and sent to a Union army prison hospital. He had been released recently in an exchange of prisoners.

Weldon joined *America* in her home port of Holmes Hole (now renamed Vineyard Haven) on Martha's Vineyard, where Captain Luce waited a month to get men, but having found only a few, he sailed across to New Bedford on 10 September, hoping to have better luck there. At last, on 15 November 1862, the little bark sailed from New Bedford and headed south.

George Weldon soon established himself as a popular member of the crew. He was strong and quick and did his share of the work. He was assigned the position of tub oar in the second mate's whaleboat, a position always assigned to one of the stronger men. Weldon had a fine tenor voice and drew a crowd whenever he sang one of the many ballads he knew. He could dance a jig better than anyone else on board.

Weldon's only problem was his quick temper. He once got into an argument with the cook and went for the man with a knife. Fortunately, his shipmates were able to restrain him, but later in the voyage, it was Weldon's temper that proved his undoing.

On 9 January 1863, *America* was cruising off the southeastern coast of South America, not far north of the Falkland Islands, looking for whales. A whale was sighted, the boats were lowered, and Weldon took his place in Second Mate Robert G. Smith's boat. Weldon, apparently, was not feeling well that day, and after a few hours he slackened on his oar.

Smith shouted at him, 'Pull, Weldon, dam'ee!'

Weldon released the oar and shouted back, 'I ain't going to pull anymore.'

'You ain't, be you?' roared Smith, 'You take up that oar and pull!'

'I won't pull for you or any other,' bellowed Weldon.[1]

Smith grabbed a paddle from the bottom of the boat and gave Weldon a blow on the shoulder. At that, Weldon pulled a knife out of the pocket of the sailor next to him and lunged at Smith. The rest of the boat's crew held Weldon, and after a dangerous struggle, they subdued him. Mate Smith gave the order to abandon the chase and to return to the bark.

When Captain Luce heard Smith's report of Weldon's mutinous behavior, he immediately ordered that Weldon be flogged. As was the custom, the men gathered on deck to witness the punishment. The captain ordered that the young man be stripped to the waist. At this point, Weldon shouted out that 'he' was a woman. The flogging was cancelled, Weldon was relieved of all duties, and 'she' was removed from the forecastle to the officers' quarters. The log entry for that day reads:

1. This conversation was reported by Barkley Renear, who had been a shipmate of Weldon in *America,* in an interview in the Vineyard *News* in 1919.

Bark America *in the South. Friday, January 9, 1863.*
Comt. [Commenced] with light breezes from Nth [north]. The boats in chase of whales. At 3 p.m. boats come on board. This day found out George Weldon to be a woman, the first I ever suspected of such a thing. At sundown took in sail. Latter part fine breezes from S. by W. Steering E.S.E. Three sails in sight. Latt. 46:00, Long. 56:20.

That is the only reference to George Weldon in the log.

Reminiscences by Weldon's shipmates, give more details. Her real name was Georgiana Leonard. Her new story was not very different from the one she had told when she signed on *America* four months earlier. She said she was from Maryland, the daughter of a Confederate cavalry colonel. Early in the war she had run away from home and, disguised as a boy, joined the Confederate army. Because of her expert horsemanship, she was assigned to the cavalry, and for a time she served in her father's regiment. (Her father never learned that his daughter was one of his soldiers.) She repeated her earlier story of being wounded, captured by Union forces, and placed in a prison hospital, but now she said she was released when it was discovered she was a woman. Even after these grim experiences, she seemed to thrive on life as a man, and soon after her release from the hospital she signed on *America*.

It was not until six months after her discovery that Georgiana Leonard was put ashore. In the meantime, the little bark sailed around Cape Horn, across the Pacific, and into the Indian Ocean. Captain Luce was not a man to waste the services of any able-bodied person under his command: Georgiana Leonard exchanged jobs with the cabin boy.

Jethro Cottle, third mate on the voyage, later recalled the attitude of the men toward Georgiana:

> We couldn't think of her as a woman at all. She still wore her sailor togs, and besides, when you have come to look on a chap as a tough fellow, smoking tobacco and dancing jigs, and fighting with the cook, it's hard to change your mind and regard her as a woman. But the boys certainly did treat her royally, and after the discovery she really quieted down and was a different chap from the 'George Weldon' that came aboard at Holmes Hole.[2]

In July, 1863, *America* sailed into the harbor at Port Louis on the island of Mauritius where Captain Luce arranged for Georgiana Leonard to be signed on as stewardess in an American clipper ship headed back to the States. In this way, she worked her passage home, and Captain Luce, unlike poor Captain Sullivan, lost no money on her account. Leonard performed her work as stewardess well, and upon the clipper's return to New York, she signed on again and completed several more voyages, and the following year she married one of the ship's officers.

There is one more interesting detail in the story of George Weldon/Georgiana Leonard. A number of years after Captain Luce had retired from the sea and was living on a farm on Martha's Vineyard, he and his wife were visited by Georgiana Leonard and her husband. The two couples became friends, and Georgiana (whose married name is not known) became a regular visitor at the Luces' farm. How curious that the venerated old Yankee captain formed a friendship with the sailor who had caused such a ruckus under his command, and a Rebel and a woman at that.

2. This quotation is taken from an interview with Captain Jethro Cottle of Martha's Vineyard in the New Bedford *Evening Standard* in 1903.

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Contingency Planning and the Defeat of the Spanish Armada

By Ronald Pollitt*

PERHAPS it is absurd to discuss the defeat of the Spanish Armada in the context of contingency planning, for the phrase itself has a distinctly modern character. It conjures up images of strategists weighing options, estimating enemy strengths, and neatly arranging a nation's resources to be mobilized in time of crisis. And indeed, contingency planning has for some time been part of the daily tasks of each nation's bureaucracy. One would, for example, have to be terribly naive to think that the Thatcher government met the Falklands crisis successfully on an *ad hoc* basis. Yet the same students of political and military affairs who readily credit the contingency planners of modern governments with national successes are reluctant to consider planning as a phenomenon with roots deep in Western, and especially English, history.

In part, the very nature of contingency planning discourages viewing it as anything but a child of the modern era of technological networks and ready access to an inexhaustible store of data. After all, contingency planners are paid not simply to identify potential enemies, but also to assign specific military units to deal with any political or military emergency. Moreover, contingency planning is not usually perceived as integral to the functioning of Western states before the Industrial Age. In part this oversimplification results from the slow pace at which governments operated. It also derives from the notion, deeply entrenched in current views of the early modern era, that government was monolithic and hence antithetical to the teamwork so basic to contingency planning.

As though modern misperceptions in considering contingency planning as a factor in the defeat of the Armada are not enough, there are also the constraints imposed by four centuries of tradition in historical writing that account for the English triumph. Most recently, David Howarth has authored quite a good book wherein he endeavors to analyze the Armada from the Spanish viewpoint.[1] Howarth's account of the English victory in 1588 includes a concise summary of the scholarship that has sought to explain why things turned out as they did. He includes, for instance, such issues as the relative seaworthiness of the ships, the technical obstacles to mounting a combined operation using primitive communications, and the supply problems faced by the Spanish. Howarth even offers new insights into the struggle, such as the Spanish strategic blunder of tracking the English coast. He also points out the administrative difficulties which confronted Philip II in trying to launch the Spanish attack and then renew it after costly delays. But neither Howarth nor any of the other Armada historians has ever viewed the Spanish defeat of 1588 as resulting in part from English naval bureaucratic prowess. Human nature being what it is, historians prefer to write about Hawkins commanding a squadron, not Hawkins as Navy Treasurer issuing directives to clerks to purchase powder, shot, and cordage. But it is obvious that without proper manning, rigging, and victualling, the Royal Navy could not have contested a Spanish invasion, and the administrative cornerstone of England's victory was contingency planning. Curiously, the planning that contributed to Philip II's defeat in 1588 began nearly twenty years earlier with an event never mentioned in Armada accounts, the Northern Rebellion.

Occurring in 1569, this uprising is usually remembered both as the final attempt to reverse the course of the Reformation and as the last feudal rebellion in English history. It is not, however, noteworthy for naval actions. Essentially, it was an ill-conceived venture that sought to place Mary Stuart on England's throne, restore Roman Catholicism, and break the power of such 'new men' as Sir William Cecil. Ambitious though these goals may have been, there was nothing sufficiently compelling in them to excite enough concern among Elizabeth and

* I am indebted to the Taft Committee of the University of Cincinnati, whose support made the research for this essay possible, and to Sally Kramer of the University Library for assistance both in research and preparation of the manuscript.

1. David Howarth, *Voyage of the Armada* (London, 1982).

her Council to lead them to overhaul the nation's defenses. After all, the revolt of the Earls of Northumberland and Westmorland initially seemed to be a civil phenomenon, dangerous but likely to be contained and turned to the Crown's advantage.[2] Yet there was one feature of the Northern Rebellion which precipitated a revamping of England's defenses. The rising was not, as it first appeared, simply a localized, domestic problem. Instead, it was the result of an elaborate, if harebrained, scheme to combine a domestic rebellion with a foreign invasion. It was this combination of features that obtusely made the Northern Rebellion the foundation for the planning that ultimately contributed to the defeat of the Armada.

When the rebel Earls first hatched their plot, they cast about for whatever help they could find. Since the revolt was in large part for Catholicism, they soon made contact with de Spes, the Spanish Ambassador, who offered Philip II's aid.[3] Never overly troubled by practical realities, de Spes led the Earls to believe that they could expect support in men and supplies from the Duke of Alva, Philip's commander in the Netherlands. While it is doubtful that Alva was ever directly contacted by the Ambassador about attacking England, the notion that a Spanish force would invade Elizabeth's realm to assist rebels in deposing the Queen had a far-reaching effect.

To a certain extent de Spes's involvement doomed the revolt, for the Spanish proposal deceived the Earls into placing too much hope in Alva's intervention. When the rebellion began, they never firmly decided upon strategic goals such as seizing York or freeing Mary Stuart, because by nature they were fearful and indecisive and also because they expected the Spanish to provide direction. The Earls did, however, send Christopher Neville and a powerful force to seize the port of Hartlepool, which was accomplished in the most efficiently executed operation of the rebellion. Neville's effort was, of course, designed to provide a secure harbor for the Spanish reinforcements to land. At the same time that it misled the rebel Earls, the Spanish proposal also galvanized the English government into taking action that went far beyond the containment of the Northern Rebellion.

Never mindful of security, de Spes and his contacts in the Netherlands apparently openly discussed the plot for Alva to aid the English rebels. Soon, English agents in the Low Countries learned of the scheme and immediately alerted the government in London.[4] Alarmed, the Crown ordered naval action to frustrate whatever attempts Alva decided to make to aid the Earls. The Navy Board was ordered to prepare three ships, *Ayde, Phoenix,* and *Bark of Boulogne,* which were commanded by Captain John Henshawe. He was directed to blockade the Yorkshire-Durham coast 'by the space of xxviii daies begynning the iiiith of December and ending the last of the same . . . ,' paying special attention to the port of Hartlepool.[5] There may even have been a larger fleet off the Yorkshire coast, for the Lord Admiral reported that seven Royal Navy ships had been spotted off Scarborough blockading the rebels.[6] Regardless of the details of the blockading squadron, what the Northern Rebellion produced was a recognition by Elizabeth's government that, despite decades of Anglo-Spanish amity, Philip II really was England's enemy; and, even more significantly, the realization that a Spanish inspired invasion of England was a present danger.

In the aftermath of the Northern Rebellion, Sir William Cecil reviewed the crisis and its meaning for the future, and eventually he expressed his thoughts in a memorandum. Entitled 'A short Memoryall of the State of the Realme,' this document enumerated the perils England faced, the persons responsible for them, and the steps that should be taken to secure the nation.[7] Among the more prominent of the perils was the Spanish menace, which reinforced Cecil's growing concerns about naval defense. The 'Lack of Marrynors for Shipps' worried him, and he determined to see that the navy would be adequately manned. He further decided to see 'The Navy put in redyness, Captayns to be named for the Seas, and a certen Force registered and known to be in redynes.'

These decisions by Cecil, designed to enable the gov-

2. Two of the better accounts of the Northern Rebellion are to be found in Wallace MacCaffrey, *The Shaping of the Elizabethan Regime* (Princeton, 1968); and Anthony Fletcher, *Tudor Rebellions* (London, 1968). Cuthbert Sharp, *Memorials of the Rebellion of 1569* (London, 1840), contains a rich store of documentary evidence, but the work is more a tour de force in manuscript collection and transcription than it is in historical writing. I am currently completing a study of the rebellion.

3. For de Spes's involvement, see, for example: *Calendar of Letters and State Papers Relating to English Affairs, Preserved Principally in the Archives of Simancas* (London, 1894), Vol. II, p. 201.

4. John Marsh, Governor of the Company of Merchant Adventurers, was one of the most effective English agents in the Netherlands. He was among the first to inform London that the rebels were likely to receive aid from the Duke of Alva. See R. Pollitt, 'The Abduction of Doctor John Story and the Evolution of Elizabethan Intelligence Operations,' *Sixteenth Century Journal,* XIV (1983), n. 37.

5. Great Britain, Public Record Office, *Audit Office Declared Accounts,* Bundle 1682, no. 5 (AO1/1682/5). All PRO documents will hereinafter be cited by PRO call number.

6. PRO, SP12/60/36.

7. Samuel Haynes, ed., *A Collection of State Papers* (London, 1740), pp. 579-88.

ernment to know its exact maritime strength, first found expression four months later in a report that summarized the condition of the Royal Navy. A model of verbal economy, the document included everything that a policy-maker would need to know to assess the Royal Navy's strengths: ship names, tonnages, numbers of mariners, gunners, and soldiers.[8] It also demonstrated the high level of governmental interest in its content, for the document has several notations in the hands of Lord Admiral Clinton and Secretary Cecil concerning ship names and prospective captains. But what is most revealing about the document in the context of embryonic contingency planning is that among the Clinton/Cecil superscriptions of ship names is *Revenge,* which was not built until 1577. Inclusion of *Revenge* in a ship list of a report clearly dated 30 July 1570, can only mean that this naval data was kept handy by the Council, amended and modified as the need arose, and used to assess the changing naval requirements of the state.

If, after the defeat of the Northern Rebellion, Cecil and his colleagues had any doubts about the need to be on guard against the Spanish, they were dramatically dispelled in 1571 with the exposure of the Ridolfi plot. Named for the Italian banker who was the linchpin of the conspiracy, this plot entailed the revival of the Northern Rebellion on a grander scale.[9] Its primary aims were to restore Catholicism, eliminate Elizabeth and her Council, facilitate the marriage of Mary Stuart to the Duke of Norfolk, and place Mary on Elizabeth's throne. It was not so much the immodesty of the goals of the Ridolfi plot that disturbed Elizabeth's officials as it was the means by which they were to be attained. As in 1569, a domestic rebellion was to be fomented. According to Ridolfi, the rising would include most of England's old nobility leading a force in excess of 50,000 men. The disturbing feature of the plot was not, however, its domestic facet, but rather the role the Spanish were to play in assuring its success. This time, Philip's forces were not merely supposed to aid the English rebels, they were to constitute an equal or superior force to that of their English allies.

Although there is reason to doubt Ridolfi's seriousness in hatching this scheme, and there is even more reason to conclude that Alva thought it was ridiculous, it seems clear that Philip II believed in it. Unaware of the differing assessments of the plot by Alva and Philip II, and alerted to the danger posed by a domestic rising combined with a foreign invasion, Cecil and his colleagues were compelled to take the scheme seriously. Cecil had more reason than the other councillors to worry about Ridolfi's enterprise, for he had penetrated the plot, knew all of its details, and was shocked at the enormity of the scheme. His understanding of the Ridolfi plot did not, as is usually portrayed, stem from the arrest and interrogation of Charles Bailly. Instead, Cecil learned the details of the conspiracy from John Hawkins, who had convinced Philip II that he was willing to betray Elizabeth and cooperate with the Spanish in leading an invasion fleet from Iberia. Indeed, it was this naval side of the Ridolfi plot, one incidentally usually overlooked by historians of the event,[10] that made it seem so dangerous to the English, for this time the Spanish were not simply planning to send some men and equipment to Hartlepool. They were committed instead to send two large fleets, one from the Netherlands and the other from Spain, to join with the English rebels in what promised to be a foolproof plan for the destruction of Elizabeth's government. When, thanks as much to Hawkins's counterespionage skills as to the arrest and interrogation of most of the plotters, the Ridolfi plot was exposed, its danger perforce melted away.[11] But in the aftermath, when Cecil and the other Councillors discussed the Ridolfi plot in the context of national defense, they came to some important conclusions.

What was most obvious in any study of the Ridolfi plot was England's inadequate resources to defend herself if the plot had actually been implemented. What if, the motto of all planners, the Spanish had sent invasion fleets to two points on England's coast while the Crown's army was suppressing a major revolt in the interior. The result could easily have been disastrous, so Cecil and his colleagues, concluding that it would be best to prevent the Spanish from landing, looked to the naval resources available to impeach two Spanish landings simultaneously. Judging from the data in the July 1570 ship list, the prospects were not encouraging. According to the most optimistic estimates, only two squadrons of a dozen ships each would be available to patrol the Channel and the North Sea. Suggestions that these fleets could, as they had in times past, be expanded by the inclusion of armed merchantmen reduced the level of apprehension somewhat. But when it was learned that there was no coherent

8. PRO, SP12/71/70.

9. The most interesting and provocative study of the Ridolfi plot is in Francis Edwards, *The Marvellous Chance* (London, 1968).

10. MacCaffrey, *Shaping Elizabethan Regime,* discusses the Ridolfi plot, but he omits Hawkins's part in exposing it.

11. The best account of Hawkins's role in exposing the military details of the Ridolfi plot is in J. A. Williamson, *Hawkins of Plymouth* (London, 1969), second edition, pp. 177-88.

body of information about the nation's merchant marine strength, the level of concern rose again. What good would it do to think in terms of supplementing the Royal Navy with merchantmen if no one knew how many merchantmen there were, where they were located, or who their masters were? Ever the practical administrator, Cecil took immediate steps to fill this gap in England's naval defenses. He ordered a comprehensive survey of the merchant marine so that the Crown would know the extent of its naval resources if the realm were again threatened.

The survey which resulted was a remarkable document that sheds light both on the state of England's merchant marine and the development of national defense planning. A manuscript book of some fifty pages, entitled 'Marchant Shipps in England, A. 1572,' compiled under the direction of Thomas Colshill, Surveyor of the Port of London, this census of English merchant shipping provided Elizabeth's officers with an invaluable store of strategic information about the nation's mercantile marine.[12] Perhaps the most notable feature of the survey is the systematic way Colshill organized the data, for the document contains considerably more than, as the first page announced, 'The Numbre of Shippes and vessells and the Maisters names, being in all the Portes and Crekes wthin the Realme of England.' Beginning with Newcastle and including all of the other ports, Colshill incorporated a wealth of information for planning within the general divisions of the large ports. Under the heading for the port of Lynn, for instance, any planner could see by a glance at two pages not only that Lynn itself had two ships of 100 tons, *George* and *Hare,* whose respective masters were William Beedome and William A. Lee; he could also note that incorporated in the Lynn area were such smaller ports as Welles, Hychyn, Claye, Burneham, and Weveton, with ships ranging in size from 60 tons to 10 tons. There was, moreover, a useful summary of the specific information at the end of the Lynn entry, which informed the planners that the area could supply sixty ships of varying size with their masters. On the last page of the book was a revealing summary of the specific information. This recapitulation informed the planners that at Michaelmas 1572, the Royal Navy could be supplemented by 1,383 merchant ships ranging in size from 240 tons to 6 tons. The census did not, of course, provide data on availability or conditions of the vessels, but inasmuch as many of these ships already carried armament, the knowledge that England would not have to rely on a handful of Royal Navy ships for her defense conveyed some sense of security. What is probably more to the point, however, is that with this survey of 1571-1572, the Crown began to keep a close eye on the state of naval defense. Consequently, the decade of the 1570's was one when Cecil, who became Lord Burghley in 1571, and his colleagues adopted a new approach toward the navy. Since the beginning of Elizabeth's reign they had been content in a general way to expand the Royal Navy and encourage maritime growth, but now they adopted a policy that enabled them to monitor England's entire naval establishment. Their intensified record keeping soon gave birth to a primitive form of contingency planning predicated on the likelihood of a military confrontation between England and the Spanish Empire.

One volume of documents which dates from the middle years of the 1570's affords an insight into the thinking of Elizabeth's planners.[13] Although the volume contained such diverse information as the number of churches in the realm and the names of the Royal judges, it also included a substantial amount of information relating to naval defense. One section, for example, listed the names of 'sundrie gentlemen and captens for the Sea,' and among the names are those of several men who held important commands through the Armada. Another section listed not only an updated account of ships in the various ports, which incidentally included some 135 ships of over 100 tons and 650 ships of between 40 and 100 tons, but also a complete list of the names of masters from the Thames basin. Still another part of the volume reprised the 1570 survey of Royal Navy ships, and expanded it with additional information. Along with the names and tonnages of the ships, this new list included the numbers of mariners, gunners, and soldiers for each vessel and their requisite equipment. Thus the entry for *Triumph,* explained that it was of 1,000 tons displacement, it carried 450 mariners, 50 gunners, and 200 soldiers, and the weaponry of the men consisted of 250 harquebuses, 50 bows, 100 sheaves of arrows, 200 pikes, 200 bills, 100 corselets, and 200 murrions. This account provided all of the data that any strategic planner needed to assess the fighting capability of Royal Navy ships. Additionally, the same volume contained a wide variety of naval information ranging from the amount of twine needed in each ship to the cost of victualling. With the growth of interest in this sort of data among Elizabeth's most powerful advisers, it seems evident that in a matter of a few years her government had taken one of the most

12. PRO, SP15/22. The survey is the only document in the volume.

13. PRO, SP12/96.

important steps toward successful planning, systematic collection of reliable information.

Another sign of the Crown's growing affinity for planning can be seen in what amounts to retrospective analysis of governmental policies. In the spring of 1576, a commission was formed to survey the impact of a Parliamentary statute designed to increase the numbers of ships and mariners through requiring abstinence from eating flesh on Wednesdays. The commission, which counted among its members such distinguished naval figures as George and William Winter, William Holstok, and Christopher Baker, duly surveyed the prominent port towns as well as 'a nomber of other places generally through the whole realme,' and they reported that thanks to the statute things were much better than before. The number of ships between ten and thirty tons had grown by 140 vessels, and the military value of the increase evidently impressed the commissioners, who urged that the statute be kept in force. If it lapsed, they argued, then 'when soever the quenes Matie shulde have any occacion to send her highnes shipps to the Seas there wolde not be founde sea faringe men to man the same.'[14]

At the same time, another survey was carried out of 'Shippes newe builded since the yeere of 1571,' which informed the government of policy effectiveness and provided specific planning data. The results of this census can only have reassured the government. In London alone during that five-year period fourteen new ships had been completed, and some of them were of impressive size. *Royal Merchaunt* and *Edward Bonaventure* both displaced 400 tons, and all of the others save one were in excess of 120 tons.[15] Vindication of the Crown's policies in attempting to increase merchant shipping as well as proof of the effectiveness of planning can also be seen in this survey, for both *Royal Merchaunt* and *Edward Bonaventure* were in Sir Francis Drake's squadron in 1588.[16] If nothing else, these surveys in the 1570's indicated that the Crown was aware of the growing danger posed by Spain, that the navy was perceived as the first line of defense, and that the 'muddling through' approach was giving way to systematic preparation of national resources to meet whatever military emergencies might arise.

By the beginning of the 1580's, this businesslike approach of Elizabeth's officers had become institutionalized. On 1 February 1580, in what amounts to a naval war game, a plan was drawn up elaborating 'how all her maiests shippes are to be sett in order . . . to be in a reddynes for all attemptes of eny forraine pooer.'[17] This plan was similar to earlier estimates in that it listed ships and the sailors necessary to man them. But this plan was different from earlier ones, for it was a contingency plan which posited Spain as the enemy. The fleet was not merely ordered hypothetically to go to sea, but rather 'To be in suche place in the west countrye or vppon the Sea as the Counsayle shall appoynte,' and if necessary 'Thesame x Shippes maye be assisted wth 700 Soldyers out of Devonshire & Cornewall.' Appended to this initial list of ten ships slated to guard the Channel entrance was a second list of ten more men-of-war which were ordered to 'ryde in the roades about the Isle of wighte.' It seems probable that this fleet's task was either to reinforce the Western squadron or guard against an assault from the Netherlands.

The plan of February 1580, was apparently used in the autumn of that year as the foundation for expanding the government's plans for naval defense. In October, a new study of the navy was prepared that included the usual ship names, tonnages, and numbers of mariners, gunners, and soldiers. A total of twenty Royal Navy ships manned by 5,710 mariners was listed, but that was only the beginning of the survey. It also incorporated detailed accounting and supply data. What was most unusual about this survey was that it included 'The Names and Burthen of xxii merchaints shippes mete to Ioyne wth her maiests shipes yf ned requier.'[18] An impressive list of merchant auxiliaries it was too, for it included 'Mr Owtreds new shipp' of 450 tons, 'Shoples Shipp of Dartmouthe' of 300 tons, and also *Edward Bonaventure* and *Royal Merchaunt*. In all, twenty-two merchant ships displacing 4,860 tons and manned by 2,790 sailors were incorporated in the survey, and planning had reached the stage where the government was even able to include the cost estimates for adding the auxiliaries. With the possible exception of Venice, it is doubtful if any other power at this time had such a thorough understanding of its naval resources.

Once the administrative procedures for gathering and organizing strategic data had been established, the system might easily have fallen victim to bureaucratic apathy or carelessness. Burghley's concern for national security led him, however, to keep constant guard against even the slightest erosion of what he perceived as a vital part of England's defenses. As the Spanish threat loomed

14. PRO, SP12/107/67.

15. PRO, SP12/107/68.

16. William Murdin, ed., *A Collection of State Papers* (London, 1759), p. 616.

17. PRO, SP12/136/19.

18. PRO, SP12/143/20.

larger, he thought ever more of the part the navy would have to play in defending the island, so laxity was not allowed to erode the gains made in preparing for the struggle. When, in the autumn of 1581, Burghley learned that there was some question about the fitness of ships at Chatham, he immediately brought the matter to the Queen's attention. Elizabeth responded by appointing a commission to investigate the rumors. Burghley's part in the formation of the investigative commission is beyond doubt, for the draft royal order creating the body has interlineations in his distinctive Italic hand. Apparently there was no substance to the rumors, for there is no further mention of problems at the Chatham yard.

By 1582, little more than a decade after the Northern Rebellion and the Ridolfi Plot had inspired the English to take measures to deal with a Spanish assault, the Crown's efforts culminated in what might be characterized as a minor landmark in administrative history. In December of that year a document of inestimable value was composed by the Lord Admiral for the Council's use. In fact, the superscriptions on the volume provide an unmistakable clue about who really was responsible for England's naval preparedness. In the hand of Lord Admiral Clinton, now Earl of Lincoln, was written: '1582 To my good Lord tresorer delyver this.' Following, in Burghley's hand, was inscribed: 'from ye Erle of lyncoln L Admyral The Names of all shippes wtin ye realm.'[19] Burghley's notation did not do justice to what the Lord Admiral and his staff had accomplished with this last and most important pre-Armada survey of the naval strength of the realm. It was not merely a list of the names of all ships in England. Rather, it was a book of some seventy-four folios, modestly entitled 'A Brife reporte conteinynge the names and number of such Shippes and other vessells . . . of this Realme of England,' which did far more than name ships. The book recorded, for example, the tonnage and location of each ship, starting with London, where *Edward Bonaventure* and *Royal Merchaunt* seem to have lost some tonnage, respectively reduced to 200 and 240 tons. Additionally, the volume noted each ship and its location by tonnage, starting with the merchant ships over 100 tons, and then descending to name the 'Hoyes, Barks, Crayers, and Boats certified to be lesse then 80 Tonnes,' in every port of England.

If this report of 1582 had only provided a comprehensive listing of ship names, tonnages, and locations, it would have been invaluable to the government. But in addition to the shipping data, the book also included 'An abstracte of the masters and the number of mariners and seafaringe men appertainynge to the seuerall Countryes and placs hereafter specified.' No less than a census of England's mariners, this compilation of names, locations and numbers began with a list of masters in London. Each section concluded with a numerical summary of the specific data. Thus we learn that in London there were 143 masters, and in the Thames 'from London bridge to Gravesend' there were 991 mariners, 957 wherrymen, and 195 fishermen. As in the case of the shipping information, the report proceeded from the London area through the maritime counties, again listing names of masters and numbers of mariners in larger ports such as Yarmouth with its 42 masters and 380 seamen as well as smaller ports like Beston with 5 masters and 32 mariners. In an age when precise record-keeping was in its infancy, this report in 1582 on the maritime state of England was nothing short of extraordinary. Under the circumstances then prevailing, what was more significant was that the document greatly simplified the task of the officers who would have to assume responsibility for England's security.

Since none of the appraisals of shipping and the maritime population directly asserted that their purpose was military planning, the possibility remains that this data was collected for other reasons. But there is considerable peripheral evidence to conclude that these information-gathering projects were part of a deliberate Crown policy tailored to simplify military planning. As the tension between England and Spain mounted over the years, data-gathering and planning were fine tuned and aimed at countering the Spanish menace. There were simply too many occasions after the middle years of the 1570's when cost, equipment, manpower, and related estimates for the Queen's ships were coupled with supplementing the Royal Navy with specific merchant auxiliaries for the practice to have been accidental. Similarly, the existence by early 1583 of a specific repository of all naval documents would seem to argue as much in favor of simplifying the task of military planners as it would for maintaining orderly record-keeping.[20]

Nearly four and one-half years before Philip's Armada entered the English Channel, in February 1584, Lord Burghley studied all of the military data that had been collected. He then composed a remarkable memorandum that may well have indicated a turning point in English administrative history. It was a contingency plan for fending off a Spanish invasion even before Philip him-

19. PRO, SP12/156/45.

20. See PRO, SP12/60/60 for another coordination of Royal Navy and merchant ships, and PRO, SP12/58/34 for the collection of naval documents.

self had decided on such an enterprise, and Burghley's strategic and tactical understanding as displayed in this document was so acute as to seem uncanny. He inscribed on the dorse of the treatise 'Memoriall 1584 of svndry thyngs to be executed wthin the realm to wthstande perills,' and he more formally titled it 'A Memoryall of dyvers thyngs necessary to be thovght of and to be pvt in execvtion for this sommar.' The plan merits some discussion.[21]

Although Burghley never mentioned them by name, using the term 'adversaries,' the premise of the plan was that the Spanish would invade England from the West and the Low Countries. The first two pages of the plan dealt with the mustering of land forces 'specially in the marityme countreys' and how those forces would be used in the event the 'adversaries' were successful in landing troops. Two commissioners, for instance, were to be appointed for each of the southern and western maritime counties, and they were empowered to 'vewe ye strength of all thes Cuntries fowre times over in one moneth. . . .' Any 'defawltes' in the men mustered were to be corrected by the commissioners, and their powers were so broad as to include surveys of likely landing places, where they were charged with building 'sum sconses, and Trenches to be made to cover the harquebuziers to empeache landing.'[22] What soon becomes obvious in studying the plan, however, is that Burghley never intended to counter the Spanish invasion by driving them back into the sea. He determined instead to prevent them from landing in the first place, so the heart of the plan dealt with the navy's role in defending the island.

Perhaps the most striking feature of the plan is its specificity. Burghley began by directing that 'The Q Navy wold also be pvt in redynes,' and that 'ye Great shipps of ye realme wold be also stayd from ther voyadgs to Ioyne wt hir Mats navy.' Obviously, the data on merchant shipping collected over the preceding twelve years would simplify the coordination of the Royal and merchant ships. This combined fleet then would 'be devyded in to iii Companys wherof ye on wold lye abovt ye Iles of silly, ye second abovt ye Ile of wight, ye thyrd neare harwych or in ye downs.' Students of the Armada campaign will recognize this defensive configuration immediately, for it was the one used in 1588. Reasoning that 'It is to be supposed yt the adversayryes force must come from by west,' Burghley devised a detailed scheme that countered any move that the 'adversaries' might make. So complete were his calculations that he even accounted for the possibility of an English retreat, either from the enemy or bad weather, when he noted that 'ye english navy shall alweiss have ye english ports for ther sucker, to avoyd danger we the adversary shall not have.' All in all, in the section of the plan that dealt with the 'Army by Sea,' Burghley considered every major issue germane to a Spanish attempt to invade England, and he offered precise measures to assure a successful defense of the realm. His prescience was such that he even anticipated the flight of the Armada through the North Sea after the battle of Gravelines, when he wrote 'If any attempt shall be ment, to pass towards scotland the seing of a Navy redy abovt Harwych and the downs will be a stey therof, for on wynd, shall serve to pvrsew yt shall leade them thyther.' However convincingly this memorial may testify in behalf of Burghley's abilities as a planner and strategist, it also argues forcefully for his understanding of sea power, which was the true foundation of the plan. The memorial concluded with the observation that 'Generally if ye Q navy be strong vppon ye sea nether portesmovth shepy nor harwych have nede of strength otherwise suerly these 3 places will be in danger.'

That Burghley's plan of 1584 and the data upon which it was based was used effectively by the Navy Board in preparing to meet the Spanish threat seems so evident as to need little more than summary coordination between documentary evidence and facts about the Armada. Even the dullest bureaucrat could have taken the specific data supplied by Burghley on shipping and the maritime population and with relative ease have selected a merchant auxiliary force suitable for supplementing the Royal Navy. Moreover, thanks to Lincoln's survey of 1582, manning the entire fleet with experienced seafaring men would have been easily within the capability of the Navy Board. Consequently, the English fleets that put to sea in 1588, regardless of whether they defeated the Spanish, the weather defeated the Spanish, or the Spanish defeated themselves, were the best that England had to offer. And the statistics that tell the tale of what England had to offer remain impressive. One hundred and ninety-one ships of all types from the 1,100 ton *Triumph* to the 20 ton *Black Dog* engaged Medina Sidonia's fleet. Displacing a total of 31,985 tons and manned by 15,272 seamen, the English fleets may not have done quite so much to defeat the Armada as was once thought, but they did enough to make the Spanish passage through the Channel a rough one indeed. It is difficult to imagine what 1588 would have been like if the English fleet had not been so well prepared, for perhaps Parma would have thought more of the Armada

21. PRO, SP12/68/3.
22. Ibid., f. 1 r & v.

strategy if he could have been assured of a good chance of landing his troops in England. The English were, however, prepared to meet the Spanish at sea as well as on land, and what remains odd about English accounts of the Armada is that the quality of preparation has received so little attention. Perhaps more than it is really necessary to know is known about Drake's greed, Frobisher's rashness, and Elizabeth's parsimony, but virtually nothing has been written about how all of those English ships and mariners were assembled, armed, and fed during the crisis of 1588. To a very great extent the success against the Armada resulted from luck, good seamanship, and favorable conditions, but a fair share of responsibility for the victory must go to the Crown officers who anticipated the struggle, collected the information about England's resources, made that data available to the Navy Board, and then devised a plan for countering the Spanish attack. Ironically, the victory of 1588 is easily as much Burghley's and Lincoln's as it is Howard's and Drake's, but it will take a lengthy search to find even one account of the Armada that distributes credit for the English victory that evenly.

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The Hairy Ape Reconsidered: The American Merchant Seaman and the Transition from Sail to Steam in the late Nineteenth Century

By Kenneth John Blume

TWENTY-FIVE years ago, Donald Herzog suggested that 'The merchant seaman is perhaps one of the most neglected of all social units.'[1] Fortunately, much has changed in the last two decades, and we are beginning to understand more and more about that group of laborers upon whom so much of American economic, political, diplomatic, and social history has depended. But despite all the new scholarship on this subject, there continues to be a tendency to denigrate technological change and to romanticize a golden age in the past when workers were happier and freer, and class antagonisms were nonexistent. We too often fall victim to an attitude well encapsulated by Eugene O'Neill's great 1924 play *The Hairy Ape:*

[Paddy speaks]
Oh, to be back in the fine days of my youth. . . . Oh, there was fine beautiful ships them days . . . fine strong men in them—men that was sons of the sea as if 'twas the mother that bore them. . . . Brave men they was, and bold men surely! . . . 'Twas them days a ship was part of the sea, and a man was part of the ship, and the sea joined all together and made it one. [*Scornfully*] Is it one wid this you'd be, Yank—black smoke from the funnels smudging the sea, smudging the decks—the bloody engines pounding and throbbing and shaking—wid divil a sight of sun or a breath of clean air—choking our lungs wid coal dust—breaking our backs and hearts in the hell of the stokehole—feeding the bloody furnaces—feeding our lives along wid the coal, I'm thinking—caged in by steel from a sight of the sky like bloody apes in the zoo! [*With a harsh laugh*] Ho-ho, divil mend you! Is it to belong to that you're wishing? It is a flesh and blood wheel of the engines you'd be?[2]

Notwithstanding these romanticized portraits of Happy Jack Tar under sail, evidence suggests that the quality of seamanship, the general conditions of work, and the general scale of wages, improved *as a result of* the gradual triumph of steam during the late nineteenth century. But in order to examine this issue the historian must go beyond the usual nostalgic imagery of literary men, the fuzzy recollections of old salts, and the emotionally charged rhetoric of both labor and industry spokesmen.

The maritime worker's wages provide one measurement of his relative position during the late nineteenth century. This is not to say, of course, that wage rates are unambiguous indicators of either job satisfaction or job status—but nevertheless they are one piece to the puzzle. We can make three clear-cut statements regarding the wages of merchant seamen during this period. First, American sailors, regardless of whether they worked aboard sailing vessels or steamships, were better paid than their counterparts in any foreign country (See Table I). This was a source of concern to those who saw shipping as America's only 'unprotected' industry and therefore vulnerable to foreign competition,[3] but the issue of the declining American merchant marine need not concern us here. Suffice it to say that American wages were higher, and that the pattern was nothing new.[4]

The second important characteristic of maritime wages rates is that seamen on coastwise lines received higher wages than seamen on foreign voyages (Table II). However, there was one exception to this pattern: although coastal crews generally were paid better than overseas crews on sailing ships, crews on oceangoing steamships received wages that were even higher than those their coastwise sailing ship brothers received.[5] This pattern

1. Donald Roswell Herzog, 'A Study of Labor Relations Relating to American Seamen in the Maritime Industry,' Dissertation, University of Iowa, 1955, p. 3.

2. *The Plays of Eugene O'Neill* (New York: Random House, 1954), pp. 213-14.

3. See, for example, *Report of the Merchant Marine Commission* (Senate Rept. 2755, 58 Cong., 3 Sess. [1905]), I, p. xi.

4. On this issue see, for example, *Annual Report of the Commissioner of Navigation to the Secretary of the Treasury* [hereafter cited ARCN + date], 1886, p. 196 (for comparisons beginning in 1845); H. C. Calvin and E. G. Stuart, *The Merchant Shipping Industry* (New York: John Wiley, 1925), p. 332 (for 1922 figures); and 'Everybody Knows They Lose,' *Fortune*, XVI, 3 (September 1937), p. 112 (for 1937 figures).

5. According to one seaman in 1905: 'The wages on steamers are $5 to $10 less than on sailing vessels [coastwise], and the consequence

brings us to the third characteristic of maritime wages during the late nineteenth century: workers on steamships always received higher wages than workers on sailing vessels, regardless of the nationality of the ship or

But while the discussion of new elites might be of interest, we are equally concerned here with the 'average' maritime worker during the transition from sail to steam. Available wage statistics are incomplete or conflicting,

Table I

SELECTED MONTHLY WAGE RATES, UNITED STATES VS. FOREIGN SHIPS

	Captain	*1st Mate*	*2nd Mate*	*3rd Mate*	*Eng.*	*1st Asst. Eng.*	*2nd Asst. Eng.*	*Fireman*	*Oilers*	*Trimmers*	*Seamen Miscellaneous*
United States Sail, 1870	150	60	40	35							25
British Sail, 1870	120	54	36	30							15
United States, Unspecified, 1884	—	35-50	25-30	—							12-18
French, Norwegian, Italian, German, Unspecified, 1884	—	15-20	12-15								8
United States, Unspecified, 1895-1910											45 (Pacific) 30 (Atlantic)
British, Swedish, Lascar, Oriental, Unspecified, 1884											7-25
Five United States Steamers, 1905	165-200	70-90	35-75	35-60	100-150	65-100	50-80	40	40-45	20-35	25-40
Three British Steamers, 1905	100-145	48-51	34-36	25-29	80- 82	58- 60	38-40	21-23	23	—	20-21
Two Norwegian Steamers, 1905	100-110	35-40	27-30	22	65- 75	38- 50	25-40	20	—	27	20
Two German Steamers, 1905	100	50-75	35-38	30	75- 90	60	40	16-35	18-20	15-30	15-25

Sources: *Report of the Merchant Marine Commission,* 1905, I, pp. 161-64, 301, 517-18; *Annual Report of the Commissioner of Navigation,* 1884, p. 41; House Ex. Doc. 111, 41 Cong., 2 Sess. (*Nimmo Report*), p. 51; United States Shipping Board, *Marine and Dock Labor* (Washington: GPO, 1919), 142-51.

the seaman (See Tables III and IV). The differential varies, and often (or generally) the wage rates for short voyages were higher than the wage rates for long voyages[6] (see below).

There are other factors to consider, of course. For example, Table V demonstrates a remarkable comparison between the rates of two steamship elites: the master (or captain) and the chief engineer. In some instances the difference between the two is minimal, while in some it is substantial—but in all instances the chief engineer of a steamship has become the second-highest paid worker on board the ship. Therefore, if from only the standard of wages, we can detect the creation of a new elite beginning to rival—and sometimes threaten—the status of the ship captain.[7]

yet nevertheless revealing. Table VI demonstrates the relative incomes of those maritime workers particularly close to the new steam technology, the firemen. Admittedly, they are not representative of *all* seamen, since many maritime workers continued to earn less than the national averages for industrial workers.[8] However, we must bear in mind that firemen were by-products of the new technology *and* that they were also responsible for doing the 'filthiest and least skilled work imaginable' on a ship.[9] If we consider the average earnings of industrial workers generally or water transportation workers particularly (Tables VII and VIII), it is clear that the new maritime technology was providing a potentially high-paying career for those either willing or able to provide themselves with the necessary training. Clearly, the triumph of steam shipping was offering merchant seamen a new potential for career betterment and advancement.

But why were American seamen paid more than foreign seamen, coastwise seamen more than seamen on foreign voyages, and seamen on steamships more than sailors on sailing vessels? First of all, American industrial

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is that no sailor will go on a steamer on the coast. The steamers get the rif raf [sic], anybody who is "on the bum," and even if there was an accident at sea, there would not be one man out of a score of them who could handle an oar or lower a boat to the water.' (*Report of the Merchant Marine Commission,* 1905, I, Hearings, p. 217.) Statistics do not bear out this seaman's statement, however.

6. ARCN, 1886, p. 196.

7. On this, see, for example, Edward W. Sloan, '"Vulcan Now Rides in Neptune's Barge": Steam Propulsion and Seafaring Enterprise in Post-Civil War America.' In, Joseph R. Frese and Jacob Judd, eds., *American Industrialization, Economic Expansion, and the Law* (Tarrytown, NY: Sleepy Hollow Press/Rockefeller Archives Center, 1981), pp. 55-84.

8. See ARCN, 1885, pp. 5-6, for average seamen's wages for the year ending 30 June 1885; for average industrial wages see *Historical Statistics of the United States* (Washington: Government Printing Office, 1975), pp. 166-68.

9. Robert D. Foulke, 'Life in the Dying World of Sail, 1870-1910,' *Journal of British Studies,* III, 1 (November 1963), p. 128.

Table II

COASTWISE AND DEEP SEA AMERICAN WAGES

Period	Average Monthly Wages of Crews Shipped from N.Y.	
	Foreign	*Coastwise*
July 1884-June 1885	$16.41	$18.41
July 1885-June 1886	14.71	17.67
July 1886-June 1887	23.06 (steam) 15.07 (sail)	19.42 (sail)
July 1892-June 1893	24.40 (steam) 18.58 (sail)	21.70 (sail)

Sources: Adapted from *Annual Report of the Commissioner of Navigation*, 1885, p. 270; 1886, p. 319; 1887, p. 5; 1893, p. 64.

wage rates were always the highest in the world and thus the wages of American seamen were correspondingly high. In a labor market that was international the 'port made the wages,'[10] and seamen would be paid whatever the going rate might be in the port where they signed on. Consequently, some less scrupulous masters dismissed or forced the resignation of sailors in ports where the wage rates for replacement sailors would be lower.[11]

The question of why coastwise seamen were paid more than deep-water seamen is more complex, however. In part, the foreign carrying trade was a ruthless industry that demanded lower wages in order to compete.[12] It was also suggested during the period that wages were lowest where there was the greatest competition for jobs, and that conversely the highest wages might be found on the Great Lakes.[13] But this explanation does not square with the impression of the coastwise seaman that we have from other sources, and it certainly implies that more seamen *wished* to work in the deep-sea trades than on the coastwise trade—and of this we have no evidence whatsoever. On the other hand, Silas Axtell offered a more logical answer by suggesting that because seamen in the deep-sea trades could be paid in foreign ports, American seamen could be paid less than if they were working coastwise trades out of American ports.[14]

10. *Report of the Merchant Marine Commission*, 1905, I, Hearings, pp. 56, 169, 364; *Dingley Report* (House Rept. 1827, 47 Cong., 2 Sess. [1882]), Appendix, p. 56.

11. John Greenwood Brown Hutchins, *The American Maritime Industries and Public Policy, 1789-1914* (Cambridge, MA: Harvard University Press, 1941; reprinted New York: Russell & Russell, 1969), p. 428.

12. Joseph H. Ball, *The Government-Subsidized Union Monopoly. A Study of Labor Practices in the Shipping Industry* (Washington: Labor Policy Association, 1966), p. 97.

13. ARCN, 1890, p. 9.

14. Silas Axtell, comp., *A Symposium on Andrew Furuseth* (New Bedford, MA: Darwin Press, 1948), p. 31.

Table III

SAMPLE WAGES: STEAM AND SAIL

Period	Position (If Indicated)	Wages per Month	
		Sail	*Steam*
1865-70	Average	15-18	16-20
1870	Captain	150	300
	1st Mate	60	115
	2nd Mate	40	75
	3rd Mate	35	60
	Carpenter	40	65
	Steward	35	50-100
	Cook	35	35-75
	Seamen	25	40 (Able) 12 (Ordinary)
1870-75	Average	18-20	18-25
1875-80	Average	16-20	17-22
1880-85	Average	15-20	16-25

Sources: *Annual Report of the Commissioner of Navigation*, 1886, p. 196; *Nimmo Report*, pp. 51 and 58.

Finally, it was often suggested during the period that the quality of seamen increased as the time away from port decreased—that the true 'family men,' the 'decent' types, would be interested in getting back to 'hearth and home' as often as possible, while the riffraff, the seamen who had reason to hide or run, or no reason to return, were more inclined to sign on an overseas voyage.[15] If indeed the 'upstanding' seaman wished to decrease his time between ports, we might therefore hypothesize that such a seaman might also prefer coastwise routes, and that therefore coastwise shippers had to pay a better wage for such a higher quality seaman.

Finally, we must account for the higher wage scales on steamers. Sailing ships, no matter what owners did, could not alter one particular economic reality: steamships, especially toward the end of the century, were more efficient than sailing vessels. True, sailing vessels remained a primary mode of transporting high bulk, low value cargoes, but that measure was largely defensive and ultimately doomed to failure. If indeed steam vessels were more efficient, the typical Able-Bodied Seaman was a cheaper source of labor on a steamer even if he were paid more.[16] One Able-Bodied Seaman could be more productive on a steamer, and therefore the man-ton ratios could be more competitive (lower), and therefore steamship owners could afford to pay better wages. Owners could have paid the *same* rate and thereby pocketed extra profits, but they seemed not to. In addition, sailing

15. See, for example, ARCN, 1886, p. 195.

16. See, for example, ARCN, 1894, pp. 24 and 30.

vessels undeniably were finding it more and more difficult to compete with steam. This loss of competitive edge led to undermanning and harsher treatment of seamen, which made steam a more desirable place to work, which, in turn, further destroyed sail's ability to compete since more highly trained and better seamen began, increasingly, to prefer steam—this despite the romanticized portraits we have been treated to by a century of literary men.

Did steam, therefore, bring with it a 'higher grade of seamen'?[17] If voyages involving less time between ports were voyages attracting less riffraff, more 'family men,' and, in general, a higher quality seaman, then steamships—which implicitly meant less time between ports—would naturally attract such 'superior' seamen. Wage rates, therefore, might be higher because of the more highly qualified workers. But *were* steamship seamen more highly trained, more highly qualified? Certainly, it was a part of the anti-steam canon then (and ever since) that the passing of sail meant the passing of true seamanship. Certainly, not *all* jobs on a steamer required great training and skill. On the other hand, certain jobs did require a higher level of training, and such skills were not always easy to acquire. In other words, there was a good amount of competition for seamen with such skills, and thus firemen and engineers were able to command quite decent rates of pay. In short, steam provided better wages and a more comfortable or desirable place in which to work. It would be tenuous, at best, to argue that in actuality or in perception steamers were *worse* places to work and that, consequently, steamship owners attempted to compensate for the undesirability of their vessels by paying higher wages.

We can also measure the quality of maritime work life under steam by examining shipboard health and safety and the record of shipping disasters. Was anything changing—and especially changing for the better? Naturally, certain constants of maritime life had traditionally plagued the seaman and continued to plague him regardless of the motive power of his vessel. The sea is eternal, poets remind us, and therefore will always provide a life that is different from—and most would argue less comfortable than—life ashore. For example, seasickness has been the bane of the seaman since sailing began and was certainly not ameliorated by steamships. Indeed, only in more recent generations has the use of drugs to calm the seasick stomach provided some measure of relief—but never guaranteed immunity![18] Personal hygiene, too, is a continuing problem for the seaman who spends long periods away from companions ashore. One might suggest that steamship seamen, with less time between ports and correspondingly greater con-

Table IV

AVERAGE MONTHLY WAGES YEAR ENDING 30 JUNE 1894

Mode	*Position*	*Over 1500 Tons Phila. to G. B.*	*Over 1500 Tons NY to S. Amer.*	*Under 500 Tons Phila. to Carib.*	*Under 500 Tons Balt. to Carib.*
Sail	AB	18	16	19	17
	Boatswain	20	18	—	—
	Carpenter	32	27	—	—
	1st Mate	51	50	41	40
	2nd Mate	33	32	27	24
Steam	AB	21	25	30	18
	Boatswain	—	30	—	—
	Carpenter	40	40	—	—
	1st Mate	70	80	47	50
	2nd Mate	55	55	—	35
	Fireman	—	40	40	35
	1st Engineer	125	125	122	100
	2nd Engineer	75	80	60	50

Source: *Annual Report of the Commissioner of Navigation,* 1894, pp. 25-29.

17. Ibid., p. 30.

18. A modern-day sailor-author describes his experiences in Jan de Hartog, *The Call of the Sea* (New York: Atheneum, 1966), p. 408. There are innumerable other examples, including the experiences of the present writer on brief overnight trips between Portland, Maine, and Yarmouth, Nova Scotia, and between Sydney, Nova Scotia, and the island of St. Pierre, during the summer of 1972.

Table V

MONTHLY WAGES OF ENGINEERS AND MASTERS ON STEAMERS

Date	*Engineer*	*Captain*
1870	180	300
1890 (passenger)	150	200-250
1890 (freighter)	125	150
1905	100	200
1919	160-230	230-300

Sources: *Report of the Merchant Marine Commission,* 1905, I, hearings, pp. 517-18; *Nimmo Report,* p. 58; House Report 1210, 51 Cong., 1 Sess. (*Farquhar Report*), 1890, p. 269; Willis J. Abbot, *The Story of Our Merchant Marine* (New York: Dodd, Mead, 1919), p. 362.

Table VI

AVERAGE ANNUAL EARNINGS OF FIREMEN

Year	*Annual Earnings*
1870	540-660
1886	461.18
1890	600
1894	240-630
1905	480

Sources: *Annual Report of the Commissioner of Navigation,* 1886, pp. 322-24; 1894, pp. 25-29; *Nimmo Report,* p. 58; Farquhar Report, p. 269; *Report of the Merchant Marine Commission,* 1905, I, hearings, pp. 162-63.

tact with 'civilization,' had to adopt a higher standard of personal hygiene.[19]

It has long been known that the seaman has traditionally been subject to certain types of 'occupational' diseases.[20] Some diseases result from the nature of maritime employment itself, employment involving intermittent work and rest, and sudden exertions: aneurism, hernia, or heart disease. Some result from habits characterized by long confinement followed by sudden freedom: venereal diseases and alcoholism. Some result from the climates in which a seaman often must work: liver diseases, malaria, yellow fever, dysentery, cholera, or plague. Finally, some diseases result from the immediate unsanitary environment of the seaman: rheumatism, phthisis, bronchitis, scurvy, beriberi, and lung diseases. If such afflictions have declined in the last few decades, it is clear that there was little change during the late nineteenth century.

But of all these afflictions, surely alcoholism has been most stereotypically ascribed to the seaman. It was a problem throughout the nineteenth and at least through the middle of the current century. Some seamen drink to forget the miseries of life that they have gone to sea to avoid; some because of the interminable boredom and isolation of ocean cruises. Others drink ashore because they are psychologically incapable of dealing with the freedom that follows long periods at sea, while some drink because periodic association with landward society reminds them of their problems. In other words, the type of personality drawn to the sea has historically been prone to alcoholism. One alcoholic AB said:

> When I'm at sea, standing on the bridge, looking out over the distant horizon at the clouds and sunset, I can imagine that I am anyone or anything I want to be—from Napoleon to Nelson.[21]

If the desire to be a Napoleon or a Nelson is a common urge among seamen, certainly the frustrations involved in not being able to achieve such desires can explain much of the large and continuing problem of alcoholism, common to sail *and* steam.[22]

There are also the ever-present maritime dangers that threaten shipping—and therefore the lives and safety of seamen. New York harbor is typical of a busy, safe port that is nevertheless abounding in such maritime hazards. The record books are filled with accounts (during the days of both sail and steam) of ships going aground, collisions at points of difficult navigation or during fog, pilot boat disasters, gales, pier fires, and dangers presented by changing winds and tides—a particular problem for the coasting trade.[23] Such accounts demonstrate what we already knew: that maritime work has built-in dangers that make the occupation more risky than simply sitting at home and writing about it. But can we detect any changes in maritime safety or health that can be related to the gradual ascendancy of the steamship? To be sure, steam

19. See de Hartog, *Call of the Sea,* p. 417.

20. On this see, Thomas Oliver, ed., *Dangerous Trades, The Historical, Social, and Legal Aspects of Industrial Occupations As Affecting Health* (London: John Murray, 1902), esp. Ch. 12, William Collingridge, 'Health in the Marine Service,' p. 183.

21. Quoted in Robert G. Heath, 'Group Psychotherapy of Alcohol Addiction,' *Quarterly Journal of Studies on Alcohol,* V, 4 (March 1945), p. 558.

22. See also Harry K. Rose and M. M. Glatt, 'A Study of Alcoholism as an Occupational Hazard of Merchant Seamen,' *Journal of Mental Science,* CVII (1961), pp. 18-30; and J. I. F., 'Alcoholism—An Occupational Disease of Seamen. Approaches to a Solution of the Problem in the Port of New York,' *Quarterly Journal of Studies on Alcohol,* VIII, 3 (December 1947), pp. 498-505.

23. See, Jeannette Edwards Rattray, *Perils of the Port of New York* (New York: Dodd, Mead, 1973), passim; and, for an example of the dangers of the coastwise trade, Leonard S. Tawes, *Coasting Captain. Journals of Captain Leonard S. Tawes. Relating to his Career in Atlantic Coastwise Sailing Craft from 1868 to 1922,* ed. Robert H. Burgess (Newport News, VA: The Mariner's Museum, 1976), pp. 40, 271, 288.

Table VII

AVERAGE ANNUAL EARNINGS PER FULL-TIME EMPLOYEE, 1900

Industry	*Annual Earnings*
Agriculture	178
Manufacturing	487
Mining	479
Construction	593
Transport (Total)	505
(RR)	536
(Water)	390
(Local)	510
Utilities	470
Wholesale Retail Trade	508
Finance, Insur., Real Estate	1,040
Services	340
Government	584

Source: *Historical Statistics of the United States*, pp. 166-67.

Table VIII

AVERAGE ANNUAL EARNINGS IN ALL AND SELECTED INDUSTRIES AND IN OCCUPATIONS, 1890-1900

Industry/Occupation	*Earnings*
All (Incl. Farm)	425
All (Excl. Farm)	475
Wage Earners, Mfg.	421
Wage Earners, Steam RRs	550
Street Railways	545
Gas and Electricity	649
Clerical (Mfg. and Steam RRs)	941
Bitum. Coal Mining	349
Farm Labor	230
Federal (Exec. Depts.)	1,070
Postal	919
Public School Teachers	289
Ministers	773

Source: *Historical Statistics of the United States*, p. 168; averages for 1890-1900 computed by present author.

did bring new dangers to both shipping and the seaman. Boilers could blow up—and frequently did. Coal gas could ignite spontaneously, causing devastatingly destructive fires. There are numerous examples of dramatic disasters that often captured the headlines of harbor newspapers and testified to a new brand of hazard brought on by the increasing use of steam.[24] Such problems were functions of the primitive technology that then ruled steam engineering. When that technology advanced, such accidents declined in number and destructiveness.

The growing use of steam also produced an increasing number of harbor (and sometimes high seas) collisions. For example, one-third of all American shipping accidents during the fiscal year ending 30 June 1884, were collisions—a total of some 688.[25] For the year ending 30 June 1885, 5 percent of the 677 American vessels involved in collisions were lost entirely.[26] In broad terms, the proliferating collisions could be (and were) ascribed to the increasing size, speed, and number of steamboats. Steamboats travelled too swiftly in harbors and on the high seas to be able to communicate with nearby or oncoming vessels quickly enough to prevent mishaps. Although ships had whistles to indicate their presence, they needed some method of signalling their direction. They also needed better lights and steering mechanisms. In short, the reasons for collisions varied widely, from mechanical failure to human error. (The British statistics in Table IX mirrored the American situation almost exactly.) The end of the century brought efforts to devise more effective international rules to prevent collisions. Until such rules were in effect, however, the merchant seaman stood in greater danger than ever that his ship might fall victim to some fatal accident.[27] In addition, a new danger began to present itself from the 1880's onward. Barges began to be used in coastwise trade during this period, presenting, at least according to their critics, giant hazards because of their lack of maneuverability, or on occasion their being undermanned. This new problem also required new regulations and at least temporarily caused greater dangers for the merchant seaman.[28]

To what extent can we compare the health and safety of merchant seamen on steamers with that of their brothers on sailing vessels? Even during the period, observers

24. See the pages of the *New York Times* (for example) and other New York newspapers throughout the late nineteenth century for the numerous accounts of explosion and fires. Perhaps the most famous fire was the *Slocum* disaster of 1904, while a dramatic example of ship explosion can be found in the tale of *Seawanhaka*, 1880. On these and other similar disasters see, for example, William Ray Heitzmann, 'New York Observes 75th Anniversary of *Slocum* Disaster,' *Sea History*, 14 (Summer 1979), p. 29; Frank O. Braynard, 'Trial by Fire,' *Sea History*, 17 (Summer 1980), p. 37; Herbert Quick and Edward Quick, *Mississippi Steamboatin'—A History of Steamboating on the Mississippi and Its Tributaries* (New York: Henry Holt, 1926), pp. 296-98; ARCN, 1887, p. 168; and Rattray, *Perils of Port of New York*, passim.

25. ARCN, 1884, p. 58.

26. ARCN, 1885, p. 136.

27. See the following volumes of ARCN: 1884, p. 58; 1886, pp. 100-101; 1887, pp. 177-78; pp. 227-34 and Appendix Q.

28. See Robert Miller, *The New York Coastwise Trade (1865-1915)* (New York: Library Editions, 1970; orig. Dissertation, Princeton University, 1940), p. 45; and *Report of the Merchant Marine Commission*, 1905, I, Hearings, p. 45.

Table IX

British Shipping Collisions 1877-1884

Cause	*Number*	*Percent*
Neglect or misapprehension of steering/ sailing rules	128	19.7
General negligence and want of caution	102	15.7
Bad lookout	92	14.1
Cause unknown	85	13
Fog and thick weather	58	8.9
Error in judgment	53	8.1
Neglecting to show lights	48	7.3
Inevitable accidents	29	4.4
Parting cables, dragging anchors, and fouling	27	4.1
Error of pilot	11	1.6
Want of sea room, crowded navigation	9	1.3
Want of seamanship	4	.6
Anchoring in fouled berth	2	.3
Missing stays	1	.15
Total	649	99.25

Source: *Annual Report of the Commissioner of Navigation,* 1886, p. 100; percentage calculations are by present author.

Table X

Cases of Selected Diseases Among American Maritime Workers

Disease	*1893*	*1894*	*1898*
Scurvy/Beriberi	38	31	11
Rheumatism	4,276	4,550	4,241
Tuberculosis	895	923	1,078
Respiratory	4,779	4,671	4,507
Digestive	6,400	6,658	6,979
Injuries	5,173	5,046	5,918

Source: *Report of the Merchant Marine Commission,* 1905, I, Hearings, p. 600. Figures are telescoped (by the present writer) from figures broken down for North Atlantic, Mid-Atlantic, South Atlantic, Gulf, Ohio River, Mississippi River, Great Lakes, and Pacific.

had to wade through controversial and often contradictory information. For example, a frequently cited cause of sickness and accidents aboard sailing vessels was undermanning. Anyone who has ever physically examined the size and proportions of one of those late nineteenth-century sailing ships can well imagine the difficulties that resulted when ever-decreasing crews attempted to chart such vessels over ocean waters or along coastwise routes.[29] Similarly, the desperate efforts by sailing vessels to compete with steam also led to overloading—sometimes with disastrous results. These were pre-Plimsoll Line days in the United States, after all. Great Britain instituted a 'load line' in 1876 and strengthened its regulations in 1890, but the United States lagged far behind. Meanwhile, seamen, exposed as they were to increasing dangers of overloaded ships, were the victims of impersonal economic wars over which they as maritime laborers had no influence.[30]

At the same time, maritime observers debated the relative safety of sail and steam, often in an effort to prove that the new technology was not the danger claimed by its opponents. United States Navy Lieutenant J. D. J. Kelley, a prominent advocate of American maritime revival, testified in 1882 that steamships were relatively as safe as—perhaps safer than—sailing vessels. He indicated that for the seven years ending in 1879, 4.06 percent of American steamers were shipwrecked, while 5.48 percent of sailing vessels met a similar fate. His statistics indicated a lower overall rate for other nations (a telling commentary on the state of American maritime safety) but also generally higher rates for sailing vessels than for steamers.[31] Later commentators indicated similar conditions. One writer, examining what he termed 'dangerous trades' in 1902, suggested that injuries were more common on sailing vessels because of the work aloft and the generally more laborious efforts accompanying sailing ship work.[32] More recent students of the same problem have suggested that sailing ship sailors generally were not good insurance risks because of the ever-threatening 'occupational hazards' of the job.[33] If such analyses are valid, the lot of the merchant seaman probably was improving during the later nineteenth century—perhaps because of the ascendancy of the steamship.

At the same time, however, we must note the large number of cases of tuberculosis and other respiratory diseases at this time (Table X). Contemporary observers suggested that these figures demonstrated the need for larger forecastle space. Conceivably, the large incidence of respiratory diseases among American seamen can be ascribed to the growing use of steam, with its undeniably hot, sweaty, close working and living quarters for the

29. On the question of undermanning and its impact on safety, see, for example, ARCN, 1884, p. 43; and *Report of the Merchant Marine Commission,* 1905, I, Hearings and Report.

30. *Report of the Merchant Marine Commission,* 1905, I, Hearings, pp. 279 and 367; see also Samuel Plimsoll, *Our Seamen: An Appeal* (London: Virtue & Co., 1873; reprinted White Plains, NY: Sheridan House, 1980), pp. 45-55.

31. *Dingley Report,* Appendix, p. 247; see also James Douglas Jerrold Kelley, *The Question of Ships: The Navy and the Merchant Marine* (New York: Scribner's, 1884), p. 61.

32. Oliver, Dangerous Trades, p. 184.

33. Foulke, 'Life in the Dying World of Sail,' p. 117.

Table XI

Forecastle Bill of Fare Adopted by Boston and Philadelphia Steamship Company, 1903

Day	*Breakfast*	*Dinner*	*Supper*
Monday	oatmeal	soup	cold meat
	steak	roast beef	beef stew
	potatoes	potatoes	bread
	bread & butter	turnips	tea, milk/sugar
	coffee, milk/sugar	bread	dessert
		coffee/dessert	
Tuesday	boiled hominy	soup	cold meat
	pork chops	corned beef & cabb.	fried potatoes
	potatoes	potatoes	bread
	bread & butter	bread	tea, milk/sugar
	coffee, milk/sugar	coffee/dessert	
Wednesday	hamburg steak	soup	cold meat
	potatoes	roast beef	beef hash
	bread & butter	potatoes	bread
	corn bread	macaroni	tea, milk/sugar
	coffee, milk/sugar	bread & butter	dessert
		coffee/dessert	
Thursday	oatmeal	soup	cold meat
	beefsteak	corned beef & cabb.	fried potatoes
	potatoes	potatoes	bread
	bread & butter	bread	tea, milk/sugar
	coffee, milk/sugar	coffee/dessert	prunes
Friday	hominy	chowder	cold meat
	fried fish	salt cod/pork scraps	codfish hash
	cold meat	roast beef	bread
	potatoes	potatoes, beets	tea, milk/sugar
	bread & butter	bread	dessert
	coffee, milk/sugar	coffee & dessert	
Saturday	oatmeal	soup	cold meat
	beefsteak	mutton stew	fried potatoes
	potatoes, corn bread	potatoes	bread
	bread & butter	turnips	tea, milk/sugar
	coffee, milk/sugar	bread	dessert
		coffee & dessert	
Sunday	hominy	soup	cold meat
	beefsteak	corned beef & cabb.	beef hash
	baked beans	potatoes	baked beans
	potatoes	bread & butter	bread
	bread & butter	coffee/dessert	tea, milk/sugar
	coffee, milk/sugar*		

* 'The coffee, tea, oatmeal, hominy shall have the milk and sugar added in the kitchen.'

Source: *Report of the Merchant Marine Commission*, 1905, I, p. 628.

men. By this standard, at least, steam was having a deleterious effect upon its seamen.

Table X also indicates a very small incidence of scurvy and beriberi and that digestive problems were the most commonly cited malady among merchant seamen. 'Digestive problems,' obviously, is a very broad and unrevealing category, but it permits speculation. The high incidence of alcoholism might have been a major cause, but we also need to examine the possibility that digestive problems stemmed from the diet of the seaman while aboard his ship. Measuring the diet of any group can be difficult, especially when that group is no longer living. However, for a good portion of the late nineteenth century we have on record various sets of government-mandated provisions for seamen. These guidelines help us to compare the diets of the merchant sailor and his working brothers on land. There is no way of knowing exactly if such guidelines were followed, although we *can* assume that at very least they were not exceeded. There was some effort at enforcing such scales through penalties for noncompliance, and we can tell from the reports of the shipping commissioners in various American ports that in most instances there was no serious dissatisfaction with provisions.

In examining the seaman's diet, we must remember that the special conditions of food storage aboard a ship—especially an oceangoing ship—precluded the availability of many varieties of food easily accessible to landsmen of the same era. Therefore, the bill of fare on board a ship might look fairly gruesome to landlubbers or novice seamen. It is certainly not surprising that William Sturtevant, going to sea as a boy in 1886, was disgusted by the food on his first day out:

> When it came time for breakfast I could only drink some coffee. The salt beef I couldn't swallow; it smelt bad.... When it came time for dinner, I didn't care if I had anything to eat [since he was seasick by that time].[34]

Preservation was a real problem, particularly for sailing vessels. Since they were much more at the mercy of the elements than were steamers, the chances of a sailing ship's running into bad weather, being delayed, and therefore running short of both water and provisions, were correspondingly greater than a steamer's. Seamen on steamers, therefore, benefitted.

But despite such difficulties, it was commonly acknowledged that American merchant seamen ate better than seamen of any other nation.[35] American shipowners saw the cost of provisions as one more reason why their ships could not compete economically with foreign ships. The cost per day for one vessel, for example, came to almost twice the cost per day of an equivalent British vessel.[36] What could the typical American merchant seaman expect to be fed aboard his coastwise or oceangoing ship? For insights into the quality of preparation, of course, we must rely primarily on reminiscences and the reports of shipping commissioners. If quality was sometimes poor, so also is the preparation of much institutional food.[37] But we can get some idea as to types and quantities. Table XI, while representing a coastwise vessel and therefore a diet that was quite possibly better than that provided on oceangoing vessels, and while giving no clue as to how much of the food was eaten and how much wasted, nevertheless provides us with a convenient and real perspective.

The seamen on this line clearly were not underfed. These were ample, big meals, akin to a typical farm diet in certain respects. Tailored to the needs of laborers who expend great quantities of energy and calories in pursuit of their daily work, this diet, not surprisingly, is quite starchy (note all the potatoes, typical of this period[38]) and provides a high intake of protein. On the other hand, while the storage of many items could admittedly be a problem, one might think that these coastwise ships could easily replenish their supplies at each port. But on the contrary, there is almost a complete absence of any dairy products, except for the butter that sometimes accompanied bread and the milk that the kitchen added to coffee or tea at breakfast and supper (but not lunch). There was no cheese—surprising because of the easy storage and high food value of such a product. Nor were

34. William B. Sturtevant, 'A Boy's First Day at Sea in the Bark *Belle of Oregon*—1886,' in Ernest Dodge, ed., *Thirty Years of 'The American Neptune'* (Cambridge, MA: Harvard University Press, 1972), p. 5.

35. For expressions of the higher quality fare on American merchant ships see, for example, ARCN, 1884, p. 41; *Report of the Merchant Marine Commission*, 1905, I, Hearings, pp. 301 and 369; and Report, pp. x-xi; Joanna C. Colcord, 'Domestic Life on American Sailing Ships,' in Dodge, *Thirty Years of 'American Neptune,'* p. 13; and Paul Schuster Taylor, *The Sailor's Union of the Pacific* (New York: Ronald Press, 1923), p. 24.

36. *Report of the Merchant Marine Commission*, 1905, I, Hearings, p. 301.

37. Anyone who has lived at a college and eaten at its dining facilities can vouch for the variations in the quality of such institutional food. How would historians in future years, for example, interpret the statement by the director of the institutional meal program at SUNY-Binghamton when he responded to charges that worms were found in fish served on campus by saying, 'There are worms in all fish.' SUNY-Binghamton *Pipe Dream*, XXIV, 6 (12 February 1982), p. 5. Most of us, too, are familiar with the generally dreary (but wholesome) fare served up in hospitals.

38. See Letitia Brewster and Michael F. Jacobson, *The Changing American Diet* (Washington: Center for Science in the Public Interest, 1978), pp. 41-42.

Table XII

SCALE OF PROVISIONS TO BE ALLOWED, 1872

Item	*Sun.*	*Mon.*	*Tues.*	*Wed.*	*Thurs.*	*Fri.*	*Sat.*
Bread (lbs.)	1	1	1	1	1	1	1
Beef (lbs.)	1½	—	1½	—	1½	—	1½
Pork (lbs.)	—	1¼	—	1¼	—	1¼	—
Flour (lbs.)	½	—	½	—	½	—	—
Peas (pts.)	—	⅓	—	⅓	—	⅓	—
Tea (ozs.)	⅛	⅛	⅛	⅛	⅛	⅛	⅛
Coffee (ozs.)	½	½	½	½	½	½	½
Sugar (ozs.)	2	2	2	2	2	2	2
Water (qts.)	3	3	3	3	3	3	3

Source: *Annual Report of the Commissioner of Navigation,* 1885, p. 154.

any fresh vegetables served—also surprising if one assumes that they might be acquired from port to port, but not so surprising if one considers the generally low consumption of fresh vegetables that characterized the diets of all Americans during the period.[39] Fish was served only on Fridays, since few ships took advantage of the inhabitants of the sea that surrounded them. Nor could most seamen look forward to poultry of any sort, although occasionally ships carried live poultry for the officers. In short, this was a diet that substituted quantity for variety.[40]

We can evaluate just how typical this diet really was because late nineteenth-century American seamen were one of the few groups of private-sector workers to have a government-mandated standard of provisions. Of course, we cannot be certain to what extent such guidelines were followed or to what extent seamen consumed all that was provided for them. Felix Riesenberg, commenting on the 1872 scale, recalled in 1918:

> This scale of provisions was greatly amplified a few years later [1898]. It was found that a shipmaster sticking close to the law in the matter of provisioning could easily starve a crew, as there was no control over quality.[41]

39. Ibid., pp. 49-51.

40. For an interesting contrast, perhaps indicative of the improvement in shipboard diet that has taken place in the last fifty years, see the bill of fare reproduced in James Christopher Healey, *Foc's'le and Glory Hole; a Study of the Merchant Seaman and His Occupation* (New York: Merchant Marine Publishers Association, 1936), pp. 199-200, for the Panama-Pacific Line. The most evident changes are: a wider variety of foods, and more dairy products, poultry, fresh vegetables, and fish. Of course, anyone who has travelled as a passenger or worked as a seaman on a modern freighter (1960's ff) knows how much further improvement there has been since the 1930's.

41. Felix Riesenberg, *Under Sail, A Boy's Voyage Around Cape Horn* (New York: Harcourt, Brace & Co., 1924; orig. pub. 1918), note, p. 37.

Table XIII

CALORIC INTAKE BASED ON 1872 PROVISIONS

Period	*Calories*
Sunday, Tuesday, Thursday	3,252— 5,548
Monday, Wednesday, Friday	2,276— 4,120
Saturday	2,508— 4,579
Weekly Totals	19,092—33,583
Weekly Daily Average	2,727— 4,797
Daily Median	3,762

Source: Estimations, averages, and other calculations are by present writer, based on *Nutrition Almanac,* Rev. Ed., passim.

Nevertheless, these government guidelines give us some idea of what sort of diet was considered adequate, and what sort of diet seamen actually had. We can also see what improvements—if any—were taking place. The attorney for the Atlantic Carrier's Association, which represented the coasting sail fleet of the Atlantic, claimed that, based on the 1898 guidelines, 'we feed our seamen better than the average working man is fed on shore.'[42] Let us see if he was speaking in truth or merely out of industrial self-interest.

Several characteristics are especially evident regarding the 1872 scales (Table XII). Variety is small, portions large, and the diet generally low fiber. Note that the law allowed for a variety of substitutions: coffee, cocoa, or chocolate could be substituted for tea; molasses for sugar; and, for each other, potatoes, yams, flour, rice, peas, or barley.[43] Such substitutions did not really enlarge the appeal of the provision, however, as one might easily imagine. But variety and taste, although desirable, are not the final criteria by which to evaluate a diet. Let us therefore examine the calories and food value provided by this 1872 diet. The 'weekly daily average' of calories shown in Table XIII is an estimate with a spread of almost 100 percent, from 2,727 to 4,797, emphasizing the dangers inherent in such averaging. Considering that this is a diet being fed to working men who perform strenuous physical labor every day, the lower end of the daily average would provide a barely satisfactory quantity of calories—and mainly for limited age and weight groups.[44] On the other hand, the upper end of the scale implies a calorie-rich diet, satisfactory for, and in-

42. *Report of the Merchant Marine Commission,* 1905, I, Hearings, p. 636.

43. Walter MacArthur, ed., *The Seaman's Contract, 1790-1918. A Complete Reprint of the Laws Relating to American Seamen, Enacted, Amended, and Repealed by the Congress of the United States...* (San Francisco: n.p., 1919), pp. 72-73.

44. For recommended caloric allowances today, consult *Nutrition Almanac,* Rev. Ed. (New York: McGraw-Hill, 1979), passim.

deed more than needed by, almost any age, height, and weight. Common sense suggests a middle figure of around 3,762 calories daily—sufficiently high for the type of job. Furthermore, if we assume that the approximate daily caloric consumption of all Americans in 1910 was about 3,490,[45] then we see that the seaman's diet was probably above average. It is also quite evident that seamen had a high protein diet, since they were being fed a pound of bread (worth forty to sixty grams) and ample quantities of beef or pork daily. Working laborers or not, these men were certainly receiving enough protein—which is not surprising considering that the average daily intake of protein for an American living in 1910 was around 102 grams. On the other hand, the 1872 diet seems seriously lacking in Vitamin C, since only the peas provide much of that necessary vitamin. One should note, however, that this diet was generally supplemented by lime or lemon juice in unspecified quantities.[46]

Did much change as a result of the revised scale of 1898? Seamen were offered more food and greater variety, with a number of exceptions. (See Table XIV.) The daily water, bread, and coffee rations increased, while the flour, pea, and tea rations remained the same. Pork and beef declined in quantity and frequency. But these reductions were offset by the appearance of canned meat twice a week and fish on Fridays. Vegetables are more evident also, although fresh fruits and vegetables remain scarce, to be acquired in port if available and to be served while they lasted.

The last point is significant because it offers us one of the only clues to the impact of steam on the seaman's diet. Both the 1872 and 1898 scales indicate that such items as fresh meats, fruits, and vegetables should be

Table XIV

SCALE OF PROVISIONS TO BE ALLOWED, 1898

Item	*Sun.*	*Mon.*	*Tues.*	*Wed.*	*Thurs.*	*Fri.*	*Sat.*
Water (qts.)	4	4	4	4	4	4	4
Biscuit (lbs.)	½	½	½	½	½	½	½
Beef, salt (lbs.)	—	—	1¼	—	1¼	—	1¼
Pork, salt (lbs.)	—	1	—	1	—	1	—
Flour (lbs.)	½	—	½	—	½	—	½
Canned meat (lbs.)	1	—	—	1	—	—	—
Fresh bread (lbs.)	1½	1½	1½	1½	1½	1½	1½
Fish (lbs.)	—	—	—	—	—	1	—
Potatoes/yams	1	1	1	1	1	1	1
Canned tomato (lb.)	½	—	—	—	—	½	—
Peas (pint)	—	—	⅓	—	—	⅓	—
Beans (pint)	—	⅓	—	⅓	—	—	—
Rice (pint)	—	⅓	—	—	—	—	⅓
Coffee (oz.)	¾	¾	¾	¾	¾	¾	¾
Tea (oz.)	⅛	⅛	⅛	⅛	⅛	⅛	⅛
Sugar (oz.)	3	3	3	3	3	3	3
Molasses (pint)	½	—	½	—	½	—	—
Dried fruit (oz.)	3	—	3	—	3	—	—
Pickles (pint)	—	¼	—	¼	—	¼	—
Vinegar (pint)	—	—	½	—	—	—	½
Corn meal (oz.)	4	—	—	—	4	—	—
Onions (oz.)	4	—	—	—	4	—	4
Lard (oz.)	1	1	1	1	1	1	1
Butter (oz.)	1	1	1	1	1	1	1
Mustard, pepper, & salt sufficient for seasoning.							

Source: *Report of the Merchant Marine Commission*, 1905, I, Hearings, p. 635.

45. Brewster and Jacobson, *Changing American Diet*, p. 77.

46. ARCN, 1885, p. 154.

Table XV

AVERAGE NUMBER OF MEN PER 100 TONS (EXCLUDING MASTERS) IN BRITISH MERCHANT MARINE

Year	*Sail*	*Steam*
1854	3.97	7.69
1865	3.04	5.51
1875	2.60	3.70
1885	2.09	2.47
1892	1.74	2.28
1893	1.71	2.23

Source: *Annual Report of the Commissioner of Navigation,* 1894, p. 9.

Table XVI

AMERICANS EMPLOYED ON OCEAN-GOING VESSELS

Year	*Number*	*Year*	*Number*
1800	40,000	1890	120,000
1810	60,000	1900	105,000
1820	50,000	1910	150,000
1830	70,000	1920	205,000
1840	95,000	1930	160,000
1850	135,000	1940	150,000
1860	145,000	1950	130,000
1870	135,000	1960	135,000
1880	125,000		

Source: *Historical Statistics of the United States,* p. 139.

acquired while the ship was in port. A ship that spent *less* time between ports, and reached port more often, more quickly, and more dependably, would therefore be able to stock such fresh provisions on a more regular basis. Improved government guidelines and the increasing use of steam during the period, therefore, can be seen as leading to a better diet for the merchant seaman.

The 'undermanning' of vessels—particularly sailing vessels—and the relative man-ton ratios of sail and steam were two hotly discussed topics in the late nineteenth century. We have long known that crews aboard sailing vessels were shrinking while the size of such ships was growing—all in an effort to compete with steam. Contemporary observers who saw sailing vessels manned with half (and sometimes one-quarter) the crew that comparable ships might have carried forty or fifty years earlier frequently concluded that such ships were 'undermanned,' that the crews were therefore overworked, and that the ships themselves were endangered because of inadequate manpower during an emergency. In some instances, of course, these charges were accurate. But numerous historians, especially John Hutchins, have pointed out that these schooners, with their auxiliary steam winches to operate sails, were truly great in their carrying capacities, their economies of scale, and their durability and safety.[47] It is true, as we have already mentioned, that masters were reducing their sailing ship crews in order to compete with steam—so the very existence of steam was the cause of the 'undermanning' on sail. But were steamers as 'undermanned' as sailing ships?

47. Contemporary concerns regarding the 'undermanning' of sailing vessels can be found in *Report of the Merchant Marine Commission,* 1905, I, pp. 396, 507, and 644. See also Hutchins, *American Maritime Industries,* p. 554; William Hutchinson Rowe, *The Maritime History of Maine. Three Centuries of Shipbuilding & Seafaring* (New York: W. W. Norton, 1948), p. 241; Foulke, 'Life in the Dying World of Sail,' p. 117; and Riesenberg, *Under Sail,* pp. 6-8.

Were maritime jobs being phased out because of the introduction of steam and the attempt by sail to compete by reducing costs through man-ton reductions? Clearly, the man-ton ratio on sailing vessels was steadily declining throughout the period. (The British trends in Table XV were similar to, although a bit higher than, American ratios.) Indeed, the average ratio had declined by 1893 to approximately 43 percent of what it had been in 1854—a remarkable drop. But man-ton ratios for steam were declining at the same time. This trend is certainly not surprising, because the technology was fairly experimental at the beginning of the period but was becoming much more efficient as the twentieth century neared. Therefore, the ratio of 1893 is a remarkable 29 percent of what it had been forty years earlier—clearly a much greater growth in efficiency than occurred in sailing ships. However, there is an important difference in the patterns. During the twenty-one years between 1854 and 1875, the ratio on steamers declined some 52 percent, or approximately 2½ percent per year. The decline on sailing ships, on the other hand, was much slower during the same period—35 percent, or an annual rate of 1⅔ percent per year. But, what is more important, from 1885 to 1893 man-ton ratios declined (or efficiency increased) on steamers by 10 percent (1¼ percent per year), while on sailing vessels by 18 percent (2¼ percent per year). In short, the steamship's efficiencies were slowing down, while sail, in its ever more frantic effort to compete, was increasing the pace of man-ton reductions.

Both sail and steam were economizing through better man-ton ratios, and clearly sail's economies were a reaction to the competition from steam. But, in a broader sense, is there any way that the ascendancy of steam can be related to the general trends in the maritime work force during the period? This would be hard to do con-

clusively, but it is quite clear, as innumerable maritime historians have indicated, that the United States had passed the 'golden age' of its merchant marine by the outbreak of the Civil War. The second half of the century, therefore, was a period not only of triumphing steam, but also of a declining American fleet (see Table XVI). In this context, the structure of the maritime labor force is significant (Table XVII). For example, simply in terms of manpower, the Port of New York still maintained its dominance in the American maritime world. More noteworthy, however, are comparisons of the coasting and foreign fleets and the steam and sail fleets. Clearly the Port of New York did not mirror the national pattern in numbers of seamen employed in the foreign fleet versus those employed in the coasting fleet. The ratio for New York was better than three to one, while nationally it was much more balanced, with an advantage of 7,000 (out of a total of 71,000) on the coasting side. In other words, if the twenty-two ports included in these statistics can be viewed as representative, we see that in 1894, at just about the trough of American foreign maritime decline, a solid majority of American seamen were employed in the coasting, rather than the foreign, trade. What did this mean for the steam/sail controversy then raging? Even in 1894 more than twice as many American seamen were employed on sailing vessels as on steamers (either coasting or foreign). But in the coasting trade itself—which we often forget was becoming the refuge for the American merchant marine during a period of a 'flight from the flag' in the foreign carrying trade—the ratio of sailing ship workers to steamship workers was overwhelming. In the twenty-two ports the ratio was some ten sailing vessel workers for every steamship worker, while for New York the ratio was an amazing 176:1! This means that during a period of a shrinking maritime labor force, a larger percentage of American seamen were being employed on coastwise ships—where, as we have already discussed, the wage rates were demonstrably higher, overall conditions arguably better, and steam noticeably absent. The total effect (good or bad) of steam's ascendancy was, in reality, being felt by a declining portion of American seamen.

Perhaps one might make a case that, whatever the trends in diet, wages, health, and safety, the merchant seaman's job was, over all, less fulfilling, less desirable, or less prestigious, under steam than under sail. For example, were significant changes occurring in jobs and job ranks on a steamer? There were new types of jobs, and of course some of the older ones were eliminated. There were oilers, and water tenders, and firemen, and engineers—all of whom had never been seen on a sailing vessel. But there were still stewards and cooks and messmen, and there were still Able-Bodied Seamen, and Ordinary Seamen—even if their jobs changed somewhat. There developed, in short, a new and rather different hierarchy of workers. What of the firemen and the trimmers, and the other 'toiling helots of civilization' who were required, as Paddy suggested, to sweat away their life blood in the heat of the engine room? If they were at the bottom of the ship and the bottom of the ladder in terms of a ship's work, were they necessarily less well off than the Jack Tars who risked life and limb going aloft in a gale in the middle of a 'Nor'easter'? On the contrary, they were simply a *new* underclass, doing the undesirable work that had to be done—but being better paid for their discomfort.

But what about the skills required on a steamer? Is it true—as was often claimed—that seamen trained on steamships were, somehow, poorer 'sailors' than those trained on sailing vessels? Here is an old myth that still exists. We are told, even today, that to be a good deck officer one must train on a sailing ship.[48] But much of

Table XVII

NUMBER OF SEAMEN, C. 1894

	Foreign		*Coasting*		*Coasting and Foreign*		
	Sail	*Steam*	*Sail*	*Steam*	*Sail*	*Steam*	*Totals*
New York	3,978	7,305	3,698	21	7,676	7,326	15,002
Sum of twenty-two ports	13,265	18,844	35,290	3,975	48,555	22,819	71,499

Source: *Annual Report of the Commissioner of Navigation,* 1894, p. 7.

48. For example, the Commissioner of Navigation asserted in 1885 that steamships were not good places to learn 'seamanship' and that thus there was an increasing need for training ships. ARCN, 1885, p. 149. For an example of the continuing belief that *sail* provides the best training for men at sea, see, Edwin H. Mairs, 'America's Working Heritage,' *United States Naval Institute Proceedings,* 107, 6 (June 1981), pp. 66-71.

the romanticized view of the 'old salt' is based on a refusal to admit that certain 'old skills' are no longer valuable to modern technologies. The great seaman-author Jan de Hartog wrote:

> In moments of depression, I can still brighten with the thought that I shall never set eyes on the dear old sailmaker again, stitching away in the hold by the light of a swinging lantern. Perhaps I have been unlucky, but all the sailmakers I have known were illiterate poison-pens who, every time they pricked their fingers, hissed like snakes and stabbed somebody's reputation.[49]

Old skills might be romantic and nostalgic, but they need not necessarily be the standard by which we judge all economic change.

On the other hand, can one make a case for steam's having contributed to what some sociologists and historians have described as the process of 'skill degradation'—that process by which modern industrial capitalism proceeds to increase its productivity and thereby its profit margins at the expense of the personal independence and feelings of self-worth of the working classes?[50] According to the theory, some of the 'decision making' in a craft is given to machines and is taken away from individual craftsmen. The transition from sail to steam fits this pattern, since the transition included the increasing mechanization of shipping. The theory also suggests that a process of the division of labor is instituted, making the individual craftsman more vulnerable since he no longer has total control over his 'product.' But this does not apply to the seaman's craft, since even under the most idyllic conditions of sail no one sailor performed all the jobs on a ship. Division of labor has always been a hallmark of shipboard work—under steam *or* sail. Finally, according to the theory, there is a division of 'head and hands.' The power of decision making is given to a third party, a professional manager. Again, this does not apply to ships, which have never been egalitarian or individualistic enterprises and where all decisions have always had to go through a chain of command. A sailmaker had to work in tandem with his superiors, just as a trimmer, or an oiler, or an engineer, has to work with his. Basically, one of the major critiques of the impact of industrial capitalism upon the worker does *not* apply to this particular segment of the working class. Indeed, most of the characteristics seen as being a mark of industrial capitalism (at least according to this theory) were long-established practices in shipping.

Finally, what alterations occurred in the status of the merchant seaman? Initially, engineers were allotted low status in the shipboard hierarchy, but as steam technology developed and triumphed the engineer grew in status and authority—and began to seriously threaten the traditional authority of the captain.[51] In addition, the determinants of status were changing. Physical and manual prowess gave way to technical skill and education. Thus there was an increasing call, during the late nineteenth century, for training schools for merchant seamen. Of course, prejudice remained against such schools, which according to one seaman had never turned out a sailor worthy of being 'a pimple on a deck boy's behind.'[52] Status also changed as the advent of an Engineer's Department brought about the separation of the living quarters of the 'sailors' and the 'engineers'—Foc's'l and Glory Hole.[53] Finally, during the period there were conflicting reports on the *reception* given to this new breed of technically trained seaman. To some he might be O'Neill's 'hairy ape,' but to others—cognizant of the higher level of training and education required—he was a better, more trustworthy, and more respectable member of the working class.[54] The new positions available to merchant seamen meant new potentials of status. That there continued to be a sizeable proportion of the 'underclasses' on board a merchant ship was nothing new. If they were hairy apes in the engine room in 1898, they could have been hairier baboons on the mizzenmast in 1840. Neither type was highly looked upon. The question is, did sail or steam provide more possibilities of respectability? Despite Eugene O'Neill, the evidence suggests that the answer is steam.

This problem is essentially a version of the old 'standard of living controversy' regarding the Industrial Revolution. Some of our measurements indicate that, although the new steam technology temporarily decreased the merchant seaman's well-being, in the long run his health and comfort were enhanced. On the other hand,

49. de Hartog, *Call of the Sea*, p. 452.

50. See, Harry Braverman, *Labor and Monopoly Capital. The Degradation of Work in the Twentieth Century* (New York: Monthly Review Press, 1974), passim.

51. See Sloan, '"Vulcan Now Rides in Neptune's Barge,"' and H. C. McMurray, 'Technology and Social Change at Sea: The Status and Position on Board of the Ship's Engineer, Circa 1830-1860,' in Rosemary Ommer and Gerald Panting, eds., *Working Men Who Got Wet* (St. John's, Newfoundland: Memorial University of Newfoundland, 1980), pp. 35-50.

52. 'Seven Seamen,' *Fortune*, XVI, 3 (September 1937), p. 112.

53. See James Healey's classic of the same name, *Foc's'le and Glory Hole*, and Stephen Richardson, *The Social Organization of British and United States Merchant Ships* (Ithaca: New York State School of Industrial and Labor Relations, 1954).

54. See Sloan, '"Vulcan Now Rides in Neptune's Barge."'

much of the change brought about by the advent and ascendancy of steam was immediately (directly or indirectly) beneficial. One of the modern classics of sea literature, Jan de Hartog's *The Call of the Sea,* summarizes the issue perfectly:

> The glory of the square-rigged ship has been immortalised by poets writing sonnets about long tricks at the wheel, and artists with beards singing sea-chanties in a jersey, accompanying themselves on the Spanish guitar. The advent of steam is considered to have been the advent of grime, trade unions, and class hatred between the bridge and the foc's'le. It has corrupted the salts of yore from iron men on wooden ships into wireless-operators in flowered dressing-gowns, idly fingering the keys, while their floating hotel sails itself by means of gyro compasses, consol [*sic*] and radar. On the ships of the future, all the chief engineer has left to worry about are his atomic piles.
>
> I sailed under canvas as a boy and in my memory the stalwart salts with the hearts of oak were moronic bipeds dangling in the branches of artificial trees in constant peril of their lives. The sea-chanties were ditties they were forced to sing by foreheadless bosuns, brandishing marline-spikes to mark time while pulling the ropes. I never heard it sung that my mother had a mermaid's tail, nor did I hear anybody wonder what to do with a drunken sailor. The chanties I heard were either descriptions of the cook's anatomy, or based on the fact that old captains have young wives.
>
> So, though the memory of the extinct windjammer is one of the most precious of the sea, I should not advise the young sailor to try to turn it back into reality. It was a hard life, a dangerous life, and it lacked the redeeming presence of the engineers.[55]

Perhaps it is fitting that an essay beginning with a literary lament for a lost era should conclude with a literary lambasting of such romantic notions. If the changes came as two steps forward and one step back, the net gain occurred nevertheless.

55. de Hartog, *Call of the Sea,* p. 481.

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German U-Boat Attacks on Convoy SC 118: 4 February to 14 February 1943

By David Syrett

THE Battle of the Atlantic lasted for six years, but the decisive phase of the conflict occurred during the first three months of 1943 when German U-boats attempted to cut once and for all the North American-Great Britain convoy route in the North Atlantic. In one sense World War II rested on the outcome of a series of bitterly contested convoy battles in the first months of 1943, for if the German U-boats had succeeded in stopping the flow of men, military equipment, and goods across the North Atlantic, Great Britain would have become isolated, there would have been no Allied invasion of Europe, and the Germans might well have held the strategic initiative throughout the remainder of the war.

From 1 January to 31 March 1943, German U-boats, battling not only Allied warships but also the worst weather in the North Atlantic in living memory, sank 174 Allied and neutral merchant ships[1] and lost 39 U-boats to Allied forces.[2] The battle for the control of the North Atlantic convoy routes reached a violent crescendo in March 1943; then the Germans in defeat broke off the action.[3]

During these three crucial months, one of the most significant battles in the North Atlantic was the German U-boat attack on SC 118.[4] A slow, east-bound convoy which sailed from New York on 24 January 1943, SC 118 eventually consisted of some sixty-two merchant ships and was accompanied by a local escort group as it sailed northeast along the North American coast. It picked up additional merchant vessels from such ports as Halifax as it proceeded toward 'Westomp,' the point off Newfoundland at which the mid-ocean escort forces took over from the local escort forces the task of protecting convoys. SC 118's ultimate destination was Great Britain.

In the first week of February about sixty German U-boats were in the Atlantic north of 50° N, but only a few of them could operate against SC 118. Before the convoy was intercepted, the U-boats in the North Atlantic were in widely separated groups, each of which was involved in its own special mission. The so-called HAUDEGEN group, consisting of twenty-one U-boats, was in the area south of Cape Farewell. Seven U-boats, collectively named JAGUAR, were being refueled at a point southeast of SC 118. Another group of nineteen U-boats, named LANDSKNECHT, before 29 January was operating west of Ireland at about 25° W. Eight U-boats were attacking convoy HX 224 about five hundred miles south of Greenland. Five other U-boats were outward bound from ports in the Bay of Biscay. None of these U-boat groups was particularly well located to intercept and attack SC 118.[5] On 1 February, ten U-boats from the LANDSKNECHT group were formed into the PFEIL group and ordered to proceed in a loose patrol line from 52°45′ N, 34°55′ W, to 50°51′ N, 29°35′ W, 'to close a second Northbound convoy suspected to be on the same route as Teichert's' (i.e., HX 224).[6] PFEIL, in short, was searching for SC 118.

Because the Germans knew the Allied North Atlantic convoy cycles and were able to read the Allied Combined Naval Cipher, it is not surprising that they were certain that HX 224 would be followed by convoy SC 118. The Germans also thought that both HX and SC convoys were taking the most northerly routes possible in order to gain support from land-based aircraft in North America, Iceland, and Northern Ireland.[7] On the

1. Samuel Eliot Morison, *History of United States Naval Operations in World War II* (Boston, 1975), vol. I, p. 410.

2. Admiralty Historical Section, *The Defeat of the Enemy Attack on Shipping, 1939-1945* (London, 1957), appendix 2.

3. See Jürgen Rohwer, *The Critical Convoy Battles of March 1943* (Annapolis, Maryland, 1977).

4. SC is a slow east-bound convoy and HX stands for a fast east-bound convoy. See, Public Record Office, ADM/199/56, p. vi. Hereafter, the Public Record Office will be cited as PRO.

5. PRO, ADM/233/16, pp. 21-23.

6. Operational Archives, Naval Historical Center, Washington, D.C., "Allied Communications Intelligence and the Battle of the Atlantic," vol. II, part A, Appendix A. Hereafter, this work will be cited as ACI.

7. ACI, vol. II, ch. 2, sec. 6. It was not until May 1943 that the United States Navy's OP-20-G discovered that the Allied Combined

other hand, not all the advantages were on the side of the Germans. Those U-boats which did attempt to attack SC 118 had in most cases to proceed at high speeds over great distances. Moreover, when they approached the convoy, they were on bearings which were generally not favorable for attack because many of the U-boats came from stations west or south of SC 118.

On 31 January, SC 118 reached Westomp, and B 2 Mid Ocean Escort Group, consisting of seven British destroyers and corvettes,[8] took over from HMCS *Fennel* the task of escorting SC 118. The next day, HMS *Witch,* FFS *Lobelia,* and USCGC *Bibb* joined SC 118's escort. For the next two days the convoy escorted by ten warships steamed in a general northeast direction. There were the usual alarms, problems with stragglers, and ships making too much smoke. At about noon on 3 February, a snowflake,[9] which was set off by mistake by one of the merchant ships in the convoy, was seen in broad daylight by HMS *Beverley,* one of the escort vessels, fifteen miles away. The commander of the escort group, Commander F. B. Proudfoot, RN, requested the commodore of the convoy to warn the merchant ships to be more careful with snowflakes in the future.[10]

0001/4/2/43 to 1200/5/2/43[11]

Despite the commander's warning, at 0854, the 'very first break of dawn,' SC 118 was illuminated by a snowflake fired accidentally by the Norwegian merchant ship *Annik.* One hour and fifty-two minutes later the rescue ship *Toward,* one of two ships in the convoy fitted with HF/DF[12] (the other being the USCGC *Bibb*), obtained a bearing on a radio transmission coming from several miles in front of the convoy.[13] HMS *Beverley,* while closing with the convoy from its front, intercepted the radio transmission from the rescue ship *Toward* to HMS *Vanessa,* the escort commander's ship, telling of the HF/DF contact in front of the convoy. The captain of HMS *Beverley,* anticipating the orders of Commander Proudfoot, immediately turned around to a course of 000° and informed Proudfoot that HMS *Beverley* planned to conduct a search for a U-boat in an area approximately twenty miles in front of the convoy. At 1059 HMS *Beverley* sighted the U-187 moving from left to right across the front of the convoy. HMS *Beverley* kept the U-187 on her starboard bow so that the U-boat would be forced to alter her course to the eastward to be clear of the approaching convoy. When the U-187 was out of the path of SC 118, HMS *Beverley,* at a speed of twenty-two knots, turned toward the U-boat. The order to fire was given when the British destroyer was within five thousand yards of the U-187, but because of heavy seas, which frequently hid the U-boat from the British gunners, no shot was fired before the U-boat at 1142 dived some four thousand yards in front of the British warship. Shortly afterward, HMS *Beverley* was joined by another British destroyer, HMS *Vimy.* A smoke float was dropped one mile east of the point where the U-boat had dived, and the two destroyers began to hunt the U-boat with their sonars.[14] But HMS *Beverley*'s sonar was not functioning, and therefore, as HMS *Vimy* continued the search, HMS *Beverley* carried out an 'Ob-

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Naval Cipher was totally compromised, and it was not until 10 June 1943 that this code was changed. ACI, vol. II, ch. 4, sec. 6.

8. *Vimy, Vanessa, Beverley* destroyers. *Abelia, Anemone, Campanula, Mignonette* corvettes. Professor Morison is mistaken when he states that B 2 Mid Ocean Escort Group contains Canadian ships, for the force was totally British. Morison, *op. cit.,* vol. I, p. 334.

9. An illuminating device introduced before the use of radar was common.

10. PRO, ADM/199/579, p. 38.

11. All times in this paper are local time not GMT.

12. High frequency direction finder.

13. PRO, ADM/199/579, p. 38. The official British history states that the Germans located SC 118 because of information supplied by a survivor from a ship sunk in HX 224. Captain S. W. Roskill, *The War at Sea* (London, 1956), vol. II, p. 356. Admiral Karl Doenitz in his memoirs, written after his release from Spandau Prison, adds confusion to the matter. Doenitz states that he knew that HX 224 would be followed by SC 118 and that this was confirmed by decoded Allied radio messages. The admiral also states that U-Boat Command knew that SC 118 sailed from New York on 24 January 1943. According to Doenitz, the problem confronting U-Boat Command was whether SC 118 would follow the same course as HX 224. The Germans then formed the PFEIL group to hunt for SC 118. Doenitz then states that on 4 February the U-632 picked up a merchant marine officer from a tanker sunk in HX 224 who told the Germans that another convoy was following HX 224 on the same course. Karl Doenitz, *Memoirs: Ten Years and Twenty Days* (New York, 1959), pp. 321-22. In the light of German knowledge of the Allied Combined Naval Cipher, convoy routes, and convoy cycles, it would seem unlikely that the Germans would learn very much from a single POW that was not already known to U-Boat Command. In a long report on SC 118 based on *ultra* drawn up by Commander Roger Winn, RNVR, of the Admiralty's Operational Intelligence Centre's Submarine Tracking Room there is no mention of the Germans gaining information about SC 118 from a POW. PRO, ADM/223/16, p. 23. It would appear that German knowledge of Allied codes and convoy cycles led to the formation of the PFEIL group to hunt for SC 118. It would also appear, however, from the time that the U-632 picked up the survivor from HX 224, the time the snowflake was set off, and the time of the U-187's sighting report that the snowflake was the immediate cause of SC 118 being intercepted and not information supplied by a POW from HX 224. The Admiralty's Anti-Submarine Warfare Division thought that the snowflake was 'probably' what led U-187 to SC 118. PRO, ADM/199/2017, p. 26. The official historian of the United States Navy in World War II also supports the snowflake theory. Morison, *op. cit.,* vol. I, p. 335.

14. Called asdic by the British at the beginning of the war.

servant,' which meant circling HMS *Vimy* at some distance and dropping single depth charges set to go off at two hundred and fifty feet. At about 1206, a contact was obtained by HMS *Vimy*, and at 1241 the U-187 was attacked with five Mk. VII depth charges with no result. The hunt continued, and very quickly HMS *Vimy* had a good contact, and at 1300 the U-187 was again unsuccessfully attacked with a hedgehog.[15] At 1310, HMS *Vimy* regained sonar contact with the U-boat and attacked with thirteen Mk. III depth charges. At 1333, HMS *Vimy* dropped an additional twelve Mk. III depth charges on the U-187. The German U-boat surfaced at 1337 astern of HMS *Vimy*. Both destroyers opened fire on the U-boat with their main armament and 20 mm. Oerlikons. Under the fire of the two British destroyers the crew abandoned the U-187 as she listed to port and then sank by the stern until 'her bow poised like a black vertical cone on the surface of the water before slowly disappearing from sight.' As the U-187 began to sink, HMS *Beverley* and HMS *Vimy* stopped firing and began to rescue the survivors of the German U-boat.[16]

U-Boat Command in France, upon receipt of the U-187's sighting report from 50°09′ N, 37°05′ W, ordered every possible U-boat to attempt to intercept and attack SC 118. The remainder of the PFEIL group, then northeast of SC 118, three U-boats from the JAGUAR group, and five nearest U-boats of the HAUDEGEN group, which were within one-half hour of the U-187's sighting report, were ordered to intercept and attack SC 118. U-Boat Command radioed five U-boats from the HAUDEGEN group that the 'Convoy is probably destined for Murmansk. "At 'em!" Operate ruthlessly, to relieve the eastern front.' During the afternoon and evening of 4 February the U-402, U-609, U-267, U-262, and U-135 made contact with SC 118 and joined the PFEIL group. As each U-boat intercepted the convoy, it radioed sighting reports to U-Boat Command in France. U-Boat Command informed the members of the PFEIL group that they would be refueled at sea before returning to France and that they were to continue the battle until they had only enough fuel to reach the supply U-boat. Because on 4 February the U-boats of the PFEIL group were for the most part in unfavorable positions to attack SC 118, U-Boat Command repeatedly requested more and more reports from the U-boats nearer to the convoy. For example, U-Boat Command ordered that any star shells seen be reported by radio at once. At 2223 U-609 was directed to become the shadower of the convoy, an order which was carried out until the U-boat was sunk two days later.[17]

In their first and subsequent attacks on SC 118 the Germans were at a distinct disadvantage because of the structure of their U-Boat Command and their ignorance of the ability of the Allies to take advantage of this structure. Because each U-boat was under the centralized control of U-Boat Command in France, the senior officer in the PFEIL group was not in command of the U-boats in the group. As a result, endless radio transmissions between each U-boat and U-Boat Command in France were required. Even more important, the Germans did not realize how the Allies were able to take advantage of this situation. Thus they did not know that the Allies could, and did, decode their radio transmissions and that the frequency of these transmissions were of even greater tactical significance than their contents. Nor did they know the capabilities of HF/DF and that a number of Allied escorts were equipped with this instrument.[18] Specifically, they did not know that the tactic used by Proudfoot to keep the U-boats of group PFEIL at bay during the night of 4-5 February was the simple one of taking a bearing by either D/F[19] or HF/DF on every U-boat radio transmission and then 'throwing' an escort, usually a destroyer, down that bearing to attack the U-boat that had made the transmission. Repeatedly on the night of 4-5 February, British destroyers and other escorts of SC 118 ran down bearings obtained by HF/DF or D/F and either attacked a U-boat or forced it to dive.[20]

The contest between HMS *Beverley* and a single

15. A weapon which throws missiles in front of a warship attacking a U-boat. A hedgehog missile goes off when it hits a U-boat.

16. PRO, ADM/199/579, pp. 59-60; ADM/199/1409, f. 70.

17. PRO, ADM/223/16, pp. 23-24.

18. HF/DF, like radar, was a spin-off from research into the nature of the ionosphere by means of equipment using cathode ray tubes. HF/DF was much superior to standard radio direction finding instruments for fixing the location of a radio transmission because it could do it at a great range with greater speed. HF/DF sets mounted on a ship displayed on a cathode ray tube a very accurate visual bearing on any radio transmission it picked up. The Germans, knowing that the Allies would use standard radio direction finders to attempt to locate U-boats, used a special series of codes that could be transmitted in less than thirty seconds. It is almost impossible to get a bearing on a transmission of this sort by means of a radio direction finder. But a ship-borne HF/DF set could get a very good bearing on these short transmissions, and a good HF/DF operator could tell if the transmission was made near a convoy. Brian Johnson, *The Secret War* (London, 1978), pp. 210-12. After the war, the failure of U-Boat Command to know about HF/DF and to understand its importance was considered one of the great mistakes of the Battle of the Atlantic. Jürgen Rohwer and Eberhard Jäckel, eds., *Die Funkaufklarung und ihre Rolle im Weltkrieg* (Stuttgart, 1979), pp. 130-32.

19. Radio direction finding.

20. PRO, ADM/199/579, pp. 39-40.

U-boat on the night of 4-5 February, while inconclusive in its results, provides a detailed example of the ability of the Allied escorts to take advantage of the German command structure. On that night, after HMS *Beverley* made a D/F contact bearing 125° at a range of five thousand yards, it ran down the bearing at eighteen knots and at twenty-four hundred yards located a target on the same bearing by sonar. At five hundred yards the U-boat's wake was sighted. At two hundred yards range the British destroyer illuminated the U-boat with a 10″ searchlight and a 4″ star shell, and fire was opened with twin Lewis guns and a 20 mm. Oerlikon. The star shell 'was a bad mistake as the bridge personnel were completely blinded by the 4″ for a vital half minute.' When the U-boat was again in sight from the bridge of the destroyer, she was 20° off the starboard bow and still under 20 mm. and machine gun fire. After the U-boat had disappeared, reappeared, and was seen to be submerging, HMS *Beverley*'s 'wheel was put hard to Port' and five depth charges were dropped about '100 feet or more from the U-boat, but it was a choice of now or never and [the *Beverley*'s commander] . . . wanted to add to his fright.' HMS *Beverley* then steamed away from the position for four and one-half minutes; at 2145 she turned south; at 2202 she turned north 15′ west; and at 2203 a contact was made at a range of twelve hundred yards; at six hundred yards the contact was lost; and ten depth charges were dropped at 2210 at the estimated position of the U-boat. At this juncture, HMS *Beverley* was joined by HMS *Anemone,* and both ships carried out a box search, dropping single depth charges at each turn. At 2327 HMS *Beverley* obtained another D/F bearing and ran it down. After the U-boat's wake had been sighted at five hundred yards, the destroyer's speed was increased to twenty-two knots. At a range of one hundred and sixty yards, the U-boat turned sharply to starboard inside HMS *Beverley*'s turning radius. As the U-boat began to dive, she was illuminated by a 10″ searchlight and brought under 20 mm. and machine gun fire. At 2333 HMS *Beverley* obtained a sonar contact at a range of nine hundred yards, and at a range of three hundred yards HMS *Beverley* attacked the target by dropping ten depth charges before returning to the convoy, which was reached at 0139.[21] The wild rushing about by HMS *Beverley* was not atypical, for just about every escort of SC 118 ran down sonar, D/F, and HF/DF contacts on the night of 4-5 February.

Refueling was a constant problem for the Allied escort vessels of SC 118, and late in the morning of 4 February HMS *Witch,* because of a shortage of fuel, left the convoy. Although there were fifteen tankers in SC 118, the escorts had not yet solved the problem of fueling at sea while under way. HMS *Beverley* attempted to receive oil on three different days while with SC 118 with varying degrees of success. On 1 February, HMS *Beverley* steamed alongside the tanker *Flagler* at a speed of two knots and received fuel at the rate of seven tons per hour. Because of the slow speed of the two ships and the slow rate of the flow of the oil, this method was not considered satisfactory. On 5 February, a second attempt to refuel at sea was made, but was halted by the need for the destroyer to run down a contact. A third attempt was made on 6 February, when HMS *Beverley* steamed astern of the tanker *Daylight* to be refueled. The hose jackstay parted even before the hose had reached the destroyer. The operation was continued, however, with a 2½″ canvas hose without a jackstay, but because the hose was not strong enough and parted twice in one hour and fifty minutes, only thirteen tons of fuel were received on board.[22] HMS *Vimy* had better luck with the American tanker *R. E. Hopkins*. At the first refueling, HMS *Vimy* steamed alongside the tanker and a hose was passed between the two ships. Although HMS *Vimy* in this instance received only thirty-six tons of fuel, a second attempt was successful. With HMS *Vimy* steaming at seven knots 'slightly' to the 'left' of *R. E. Hopkins*'s stern quarter, a hose, three hundred yards long, was passed from the tanker to the destroyer, and by using one hundred pounds of pressure HMS *Vimy* received seventy-one tons of oil at the rate of fifteen tons per hour. The captain of the destroyer reported: 'This is a very good way of oiling and could be done in weather of force 7. The hose is very easy to handle.'[23] Although the captain of HMS *Vimy* approved of methods to refuel at sea in current use in the Atlantic, it is clear that Allied naval forces in the Atlantic were far behind their counterparts in the Pacific. The escort group commander in his report on SC 118 had harsh remarks to make about the difficulties of refueling at sea and ended with the statement 'That an escort Commander should have the additional anxiety of his escorts running short of fuel should be unnecessary.'[24]

At 1948, 4 February, a major although temporary and inadvertent change was made in the formation of SC 118. In an effort to shake off some of the pursuing

21. PRO, ADM/199/579, pp. 65-66.

22. PRO, ADM/199/579, p. 58.

23. PRO, ADM/199/1409, f. 71.

24. PRO, ADM/199/579, p. 51.

U-boats, Commander Proudfoot ordered the convoy to make a change of course 45° to starboard. Three columns of ships on the port side, as well as some at the rear failed to receive the signal for a change of course which had been made by whistle, and the escorts were not aware of the change of course for more than three hours because the radio on the commodore's ship had broken. The net effect of these breakdowns in communications was that by 0015, 5 February, the SC 118 had split into two groups. Although the escort commander ordered HMS *Abelia* and FFS *Lobelia* to escort the ships which had not changed course to their proper stations in the convoy, at 0300, the main body of the convoy was steering 037°, while the missing three columns were fifteen miles to port steering a course of 007°, and several merchant ships were at various intermediary points between the two parts of the convoy. It was not until 0720 that the two sections of SC 118 were rejoined.[25]

Despite the confusion within the convoy, the B 2 Mid Ocean Escort Group had every reason to be satisfied with the results of its first few days' operations. SC 118's change of course and the offensive sweeps made by escorts down HD/DF and D/F bearings greatly confused the Germans as to the location and course of the convoy. Between 1700 on 4 February and 1200 on 5 February, escorts of SC 118 ran down more than twelve HD/DF and D/F bearings.[26] The U-609, assigned to shadow SC 118, lost contact with the main body and at 2323 on 4 February reported seeing star shells at 51°33′ N, 35°55′ W, but the U-906 was following the three port side columns of the convoy which had failed to change course. It was not until the afternoon of 5 February that the U-609 regained contact with the main body of the convoy. Although at least five U-boats were operating around SC 118 on the night of 4-5 February, they did not carry out a single successful attack. U-Boat Command, however, was optimistic and radioed the U-boats attacking SC 118:

> The first night does not show a thing. Experience shows the great blow does not come until later, when the enemy has been softened by continued attacks, when he has no more depth charges left and when he can no longer cope with the great number of subs. Therefore: always keep pursuing and attacking.[27]

25. PRO, ADM/199/579, pp. 39-41.
26. PRO, ADM/199/579, pp. 39-40.
27. ACI, vol. II, ch. 2, sec. 7.

1200/5/2/43 to 1200/6/2/43

As the convoy proceeded eastward, the escort vessels and U-boats continued their apparently endless and deadly game of cat and mouse. At 1112 on 5 February, the rescue ship *Toward*'s HF/DF picked up a radio transmission bearing 158° from the convoy, and Proudfoot at 1122 ordered HMS *Beverley* to run down this bearing. At 1230 Yeoman T. Thomas on HMS *Beverley* sighted a U-boat seven miles from the ship. HMS *Beverley* increased her speed to twenty-two knots. The U-boat tried to make a run for it steering a course away from the convoy, but when the British destroyer closed to within six miles the U-boat dove. HMS *Beverley* reduced speed and obtained a sonar contact at 1250 at a range of seventeen hundred yards. At 1303 a hedgehog attack was carried out, but the missiles exploded prematurely, and when contact was lost, HMS *Beverley* began a box search for the U-boat. Meanwhile, at 1346, Lieutenant A. M. Collie, RNVR, sighted another U-boat bearing from HMS *Beverley* at 087° at a range of about six miles. The British destroyer steamed at twenty-two knots toward the second U-boat, which soon sighted the destroyer and dove at about 1354. Once again the British destroyer began a sonar search. After HMS *Vimy* had joined the hunt at 1400, the two destroyers obtained many sonar contacts and carried out a number of attacks without result, until after several hours it was decided that the U-boat now was so far astern that it no longer posed a threat to the convoy. At 2100, HMS *Beverley* returned to her station, and HMS *Vimy* was ordered to take station five miles on the starboard beam of SC 118 in order to intercept any U-boats attempting to shadow the convoy.[28]

While HMS *Beverley* and *Vimy* were hunting U-boats, SC 118 suffered its first casualty. The merchant ship *West Portal* at 1300 was 'torpedoed in approximate position 55N°33W° while straggling (or romping) from the convoy.' Although it cannot be stated with certainty, it was apparently the U-262 which sank the *West Portal*.[29] By 1740 three merchant ships had fallen behind the convoy, and at 1915 the merchant ship *Polyktor* stopped dead in the water with broken steering gear. Despite these setbacks, SC 118's escort was becoming stronger, for at 2155 the USCGC *Ingham* joined the convoy, followed the next day by the USS *Babbitt* and USS *Schenck*.[30] At the same time a number of U-boats

28. PRO, ADM/199/579, pp. 71-79; ADM/199/1407, ff. 74-75.
29. PRO, ADM/199/579, p. 41; ADM/223/16, p. 24.
30. PRO, ADM/199/579, pp. 42-43.

were forced to break off their attempted attacks on SC 118. In the morning of 6 February, the U-413 was down to only twelve tons of fuel, the U-266 had only eight tons, and the U-752 was forced to return to France because of trouble with her diesel engines. At 0900 on 6 February, U-Boat Command, after expressing displeasure at the inability of the U-boats to maintain contact with and attack SC 118, ordered the U-boats 'to proceed at high speed whilst searching, making casts in various directions and listening on their hydrophones.'[31]

The tactical situation, along with the balance of power, changed radically on the morning of 6 February when SC 118 came within range of VLR[32] aircraft of RAF Coastal Command based in Iceland and Northern Ireland. The mere presence of aircraft over and around a convoy had an inhibiting effect on U-boat operations. Aircraft armed with bombs, depth charges, and guns could sink a U-boat on the surface and almost always make it lose contact with a convoy by forcing it to dive and stay submerged for long periods.[33] An example is provided by Liberator R of 120 Squadron, which attacked a U-boat forty-seven nautical miles in front of SC 118. The U-boat was first sighted at a height of three thousand feet by the aircraft while surfacing. The bomber immediately turned almost 360° to starboard while diving to seventy feet, passing directly over the U-boat, and dropping four Mk. I depth charges set to go off at a depth of twenty-five feet. One depth charge failed to go off, but the other three exploded alongside the U-boat. The U-boat, rocked by explosions, was seen by the aircraft to settle slowly, leaving behind wreckage. Underwater disturbances were still visible forty minutes later when the British aircraft left the area.[34]

1200/6/2/43 to 1200/7/2/43

The first Liberator appeared over SC 118 at 1000 6 February, and for the next eight hours VLR, aircraft of RAF Coastal Command assisted in the defense of the convoy.[35] Commander Proudfoot employed aircraft in much the same way that he used his destroyers. Aircraft which made contact with SC 118 were directed for the most part to run down HF/DF and D/F bearings of U-boat radio transmissions. The result was that, throughout the afternoon and evening of 6 February, U-boats which made radio transmissions and remained on the surface as well as those attempting to get in front of the convoy by high-speed surface runs were usually attacked by aircraft or warships or both. During the afternoon and evening of 6 February, U-boats reported to U-Boat Command that they had been attacked at least fifteen times, and during the daylight hours most of those attacks were made by aircraft.[36] A typical operation of the afternoon and early evening of 6 February began at 1810 when HMS *Vimy* was ordered to steam down a bearing toward a U-boat which had been sighted by an aircraft. At 1850, as 'Dusk was setting in,' a Liberator flew over HMS *Vimy* and informed her of the last known position of the U-boat. The aircraft then dropped a flare on the point where the U-boat had dived. HMS *Vimy,* which at 1923 began a sonar search near the flare, quickly obtained a contact, and it attacked with five depth charges. As it had now become night and because it had failed to regain contact with the U-boat and was twenty-five miles astern of SC 118, HMS *Vimy* halted the attack and returned to the convoy. Throughout this and similar attacks Proudfoot's only problem with the aircraft was his inability to ascertain to which aircraft he was speaking on the radio, for he had never been told that the way to identify an aircraft under these circumstances was to request that it 'waggle.'[37]

The Admiralty's Anti-Submarine Warfare Division in its analysis of the U-boat attacks on SC 118 stated that on the night of 6 February:

> The situation was now one to inspire at the least, sober confidence in the outcome of the battle. The first shadower had been sunk, a classic start. The following night, with the Convoy unintentionally split, had been an anxious one, but the U-boats had missed their opportunity. Again, on the next night they had kept their distance. And then, on the sixth aircraft arrived and the surface escort was reinforced by two more U.S. ships. Throughout this period encounters and attacks on U-boats had been satisfactorily frequent, and the H/F D/F in the Rescue Ship TOWARD had been invaluable.
>
> In spite of all this, however, and an escort of twelve ships, the enemy now regained the initiative and torpedoed seven ships in three hours.[38]

The Germans were able to regain the initiative in the early hours of 7 February when the U-206 and U-402

31. PRO, ADM/223/16, pp. 26-27.
32. Very long range.
33. Cf. Alfred Price, *Aircraft versus Submarine* (Annapolis, Maryland, 1973).
34. PRO, ADM/199/1409, ff. 122-26.
35. PRO, ADM/199/579, pp. 113-14.
36. PRO, ADM/223/16, p. 38.
37. PRO, ADM/199/1409, f. 73.
38. PRO, ADM/199/2017, p. 4.

managed to elude the escorts and get within the main body of the convoy.[39] Then, as the two U-boats began to attack the merchant ships, the organization of the convoy's escort fell apart. At 0248 on 7 February, the American tanker *R. H. Hopkins* was torpedoed and sunk. Two minutes later the rescue ship *Toward* suffered a similar fate, and some of its survivors were picked up by HMS *Mignonette,* which, in turn, was being screened by FFS *Lobelia.*[40] At 0315, the merchant ship *Harmala,* loaded with iron ore, was torpedoed and sank in three minutes. The crew managed to get one lifeboat and two rafts into the water; the other lifeboat and four life rafts had been lost in a gale several days earlier. FFS *Lobelia* attempted to pick up the men, but by 0412 it had rescued only thirteen men out of a total of fifty-three from *Harmala.* At the same time it was closing with a raft showing red lights, a D/F contact at a range of six thousand yards was made. The FFS *Lobelia* dropped a Carley float with a light over the side and came to full speed in order to close with the contact, which was the U-906. The report of Pierre Morsier, commander of the FFS *Lobelia,* describes what followed:

> Dropped pattern of ten depth charges, set to 50 and 140 feet. Contact lost for a few seconds, being regained on Port quarter then becoming steady on the stern. Contact was held until 600 yards. About thirty seconds after explosion of last depth charge a rumbling noise followed by a loud explosion, ending by the same rumbling noise was heard. (See recorder trace.) Between explosion of depth charge and ship, a large bubbling about three feet high with a dark hollow centre was seen by several Officers and ratings. Echo then became woolly and gradually faded. Very thorough search was then carried out without obtaining further contact.

Morsier concluded: 'This submarine is considered as sunk.' The Free French officer was correct; the U-609 never made another radio transmission and did not return to base.[41]

While FFS *Lobelia* was hunting down and sinking the U-609, the U-206 and U-402 were sinking more ships in SC 118. At 0340, the merchant ship *Afrika* was torpedoed on the starboard side and sank by the stern in eight or ten minutes. The crew and Royal Marine gunners on the *Afrika* were highly disciplined, and thirty-seven of them managed to make it into lifeboats and were picked up by the convoy's escorts.[42] Ten minutes later, the tanker *Daghild* was hit by a torpedo, and although it did not sink, it fell astern of the convoy.[43]

The greatest disaster to befall the SC 118 was the sinking of the American ship *H. R. Mallory.* The sixth ship to fall victim to the Germans in less than two hours, *H. R. Mallory* was torpedoed at 0400, and according to a report from HMS *Abelia,* a U-boat which at 0401 had 'dived 400 yards within convoy . . . probably fired torpedoes which sunk MALLORY.'[44] Out of the four hundred and ninety-five civilian, military, and naval personnel on board *H. R. Mallory,* two hundred and twenty-eight were lost. After conducting a large-scale inquiry, United States Naval Intelligence in Iceland, to which the ship was bound, concluded that most of the deaths were unnecessary. Most of her passengers were asleep, only half the gun crew was on duty, and only the standard number of merchant marine seamen and officers were on watch. The men on *H. R. Mallory* were not aware that she was under attack until the torpedo hitting number three hold on the starboard side of the ship exploded. After listing to starboard, *H. R. Mallory* righted herself, and approximately one and one-quarter hours later she sank on an even keel. Only one lifeboat was damaged during the attack. 'The conditions for launching boats and of rescuing most of the survivors can be regarded as good. . . .' Yet almost half the men on board had died. After the torpedo hit the ship, no alarm was sounded, panic rather than discipline prevailed, and no orders, commands, or control came from the bridge. In short, without even a command to abandon ship, it was every man for himself on *H. R. Mallory* after she was torpedoed.

According to the report from United States Naval Intelligence in Iceland, the panic and ensuing disaster can at least in part be attributed to the inadequacy of the boat drills before the attack. Before being torpedoed, *H. R. Mallory* carried eight large life rafts and nine undamaged lifeboats. Only four rafts were used, and of the nine lifeboats three capsized either upon hitting the water or while being lowered. Among the six remaining, one could not be lowered, one sank with men on board, one could not get away from the ship and was swamped and sank, one did get away, but was only partially loaded, one managed to get away, but was swamped, and the last got away with seventy men on board. Moreover, many of the men on *H. R. Mallory* had 'Violated a basic rule by failing to wear sufficient clothing while sleeping. Some men came on deck in shirts and trousers,

39. ACI, vol. II, ch. 2, sec. 8.
40. PRO, ADM/199/579, p. 44.
41. PRO, ADM/199/579, pp. 88-89.
42. PRO, ADM/199/579, pp. 45, 118.
43. PRO, ADM/199/579, p. 45.
44. PRO, ADM/199/579, p. 45.

lacking shoes. These would have tended to suffer more from exposure than others with complete equipment.' Panic, mismanagement, poor seamanship, lack of discipline, and a total breakdown of the command structure unnecessarily placed several hundred men, many of whom died, in the icy waters of the North Atlantic on a February morning.[45]

Those who did survive the torpedoing of *H. R. Mallory* owed their lives to the efforts and skill of the officers and men of the escort vessels. The USCGC *Bibb,* returning to the convoy after running down a HF/DF bearing, came upon the survivors of *H. R. Mallory* at 1010. The commander of the cutter maneuvered the vessel to windward of the lifeboats, rafts, and men in the water and began the task of rescuing two hundred and two men. The USCGC *Bibb* was later joined by HMS *Campanula,* HMS *Mignonette,* and USCGC *Ingham.* When the USCGC *Ingham* arrived at 1200, the Coast Guardsmen found a horrible situation. The report of A. M. Martinson, the cutter's commander, states:

> The INGHAM joined in this task picking up twenty-two officers and men from rafts. They were in deplorable condition due to long exposure. Two boats were lowered and the balance were picked up by own ship drifting alongside the rafts. It was necessary to place men upon and in the rafts to secure lines about the men as they were helpless. By the time the INGHAM arrived the large groups had already been picked up and only scattered rafts could be sighted with a few men on each. Two of the men rescued from the water died and were buried at sea. Their personal effects were given to the officer survivors for further disposal. One man was partly drowned and recovered after administering artificial respiration for twenty minutes.

The report on the sinking of *H. R. Mallory* by United States Naval Intelligence ends with the statement that

> The only bright spot in the picture is the rescue work. The BIBB did an excellent job, and the fact that the loss of life is no greater than it was, can be attributed to the BIBB's fine seamanship. It is believed that the Commanding Officer, officers, and crew deserve commendation for their work in saving the lives of two hundred survivors under difficult conditions and with considerable risk to themselves. The survivors almost unanimously went out of their way to praise the BIBB, including one heartfelt remark of a sailor that 'he would never call a Coast Guardsman a dry land sailor so long as he lived.'[46]

The sinking of *H. R. Mallory* did not mark the end of the carnage, for the Germans successfully attacked two more ships before the most disastrous twenty-four hours in SC 118's brief history had ended. At 0606, two hours after *H. R. Mallory* went down, a U-boat torpedoed and sank the Greek merchant ship *Kalliopi.* At 1550, thirty-three men from this ship were rescued astern of the convoy by USCGC *Bibb,* which was attempting to rejoin the convoy after rescuing survivors of *H. R. Mallory.*[47] Finally, on the morning of 7 February, U-266 sank the merchant ship *Polyktor,* which had dropped miles astern of the convoy because its steering gear had broken down. *Polyktor*'s master and chief engineer, who were taken prisoner by the U-266, told the Germans that SC 118 consisted of about forty-five ships, of which fifteen were tankers, that the Allied ships were in columns with about five hundred and fifty meters between each ship, that there was a close and a distant escort, and that the merchant ships' radios were operating on wave length 450 Kc/s. This information, while interesting, was of little assistance to the Germans in future operations against SC 118.[48]

It is difficult, if not impossible, to ascertain the role of Commander Proudfoot during the hours immediately following the attack on *H. R. Mallory.* The escort commander did not order the USCGC *Bibb,* HMS *Campanula,* HMS *Mignonette,* and USCGC *Ingham* to devote so much time during the morning of 7 February to picking up survivors of sunken ships. Only FFS *Lobelia* had been given specific permission to stay astern of the convoy and search for survivors, even though the second ship to be sunk that morning was the rescue ship *Toward.* Nevertheless, Proudfoot in his report noted: 'It is an understandable, but regrettable mistake that other ships took it upon themselves to remain picking up survivors in the water around them, rather than return to station as ordered.'[49] On the other hand, if one excepts an order at 0410 for 'escorts to take up appointed stations if not in contact,' Proudfoot on HMS *Vanessa* appears from his log of events and signals to have been more a spectator than a commander during the battle on the morning of 7 February.[50] The problem of just what

45. PRO, ADM/199/579, pp. 147-150A.

46. PRO, ADM/199/579, pp. 126-27, 131, 150A.

47. PRO, ADM/199/579, pp. 45, 131.

48. PRO, ADM/223/16, p. 28.

49. PRO, ADM/199/579, p. 115. In his report, Proudfoot singled out the USCGC *Bibb* for picking up survivors instead of taking her place in the convoy's screen. Proudfoot no doubt did not understand the United States Coast Guard. While the United States Coast Guard has a combat record second to none, it also is a service which has the saving of lives at sea as a major, and perhaps an overriding, mission. It would be psychologically much more difficult for a United States Coast Guard officer than for a United States Navy or Royal Navy officer to leave several hundred survivors in the water.

50. PRO, ADM/199/579, pp. 44-45.

Proudfoot did or did not do during this battle is further compounded by the fact that in his narrative of the action presented to Western Approaches Headquarters on 15 February there is an unexplained gap during the period on 7 February from 9237 to 0410.[51]

At daylight on 7 February, SC 118 was within six hundred miles of Iceland and well within range of Allied anti-submarine aircraft operating from Iceland and Northern Ireland. U-Boat Command, nevertheless, ordered those U-boats operating against SC 118 to make high-speed surface runs along the flanks of the convoy in an attempt to get ahead of it. Although U-Boat Command emphasized that contact must be maintained by 'constant reporting and intelligent cooperation,' it was not until the afternoon of 7 February that the U-262 regained contact with SC 118. At this point, the PFEIL group was ordered to 'get at 'em' and remain in contact with the convoy at dusk 'in order to clear the way for other boats.' U-Boat Command also informed the U-boats attacking SC 118 that 'the depth charges would also run out.'[52]

1200/7/2/43 to 1200/8/2/43

Following the succession of disasters during the preceding twenty-four hours, the escort vessels of SC 118 were able to abandon their hectic scrambling and settle down to a more systematic approach to their duties. The activities of the FFS *Lobelia* may, perhaps, provide a case in point. After sinking the U-609 she returned to the place where she had left the survivors of *Harmala.* The Free French ship found no survivors, but she did recover her Carley float, and at 0630 encountered a macabre, but all too common, sight in the North Atlantic during 1943, when she discovered 'Many corpses . . . sustained by their life jackets. During the search two dead ratings were discovered on a raft from S.S. van Rensselaer (sunk in HX 224).' After searching through floating wreckage for survivors, FFS *Lobelia* at 1250 set course to overtake SC 118, which was now some seventy-five miles ahead of her. At 1325, she sighted the tanker *Daghild,* which had been torpedoed that morning. After the attack, the master of *Daghild* had decided not to abandon ship until the extent of the damage could be ascertained and a decision made whether or not the tanker could be saved. Before daylight it was decided to abandon *Daghild,* and all the crew made it safely into the ship's boats. The master, however, had not destroyed the ship's secret documents, and during daylight the chief officer went on board the tanker to destroy them. While on board *Daghild,* the chief officer sighted the conning tower of a U-boat on the opposite side of the tanker from her boats. The merchant marine officer managed to get off the tanker without being discovered by the Germans, and at 1340 the U-boat torpedoed the tanker. Five minutes later the FFS *Lobelia* sighted the U-boat, and at 1355 fired twelve rounds from her main armament at the German vessel, which then disappeared into a squall. The FFS *Lobelia* rescued all the crew of *Daghild,* and after consulting Proudfoot by radio, the Free French ship sank *Daghild* with gunfire at 55°25′ N, 26°06′ W. FFS *Lobelia* then proceeded to rejoin SC 118.[53]

Before the FFS *Lobelia* had resumed its assigned position with the convoy, the strategic advantage shifted to the Allies, for during the daylight hours of 7 February eight VLR Liberators and Flying Fortresses of RAF Coastal Command were dispatched from Ballykelly and Benbecula in Northern Ireland to support SC 118. Although at 1640 a Coastal Command Liberator flew over the convoy, most of these aircraft were deployed in sweeping the area ahead of SC 118 or in carrying out 'parallel track sweeps' (i.e., flying along the flanks of the convoy to prevent U-boats from making high-speed surface runs along the edge of SC 118 in an attempt to get ahead of the convoy). The objective of such flights was to attack or at least force any U-boats in front or on the flanks of SC 118 to dive. These flights were ten or more hours long and put a heavy strain on the air crews.[54] The deployment of VLR aircraft was a great assistance to the defense of convoys, and on 7 February the air tactics resulted in the sinking of the U-624. Flying Fortress J of 220 Squadron, while carrying out a parallel track sweep fifty-five miles from SC 118, at 1807 saw the wake and then the hull of U-624. The pilot altered the aircraft's course and climbed into some nearby clouds. After four miles the aircraft dove to a height of five hundred feet to attack the U-boat, which was seen to starboard through a heavy rain shower. The aircraft then turned to port and approached the U-624 on the submarine's port beam. Emerging from the rain about a mile from the U-boat, the British aircraft attacked from a height of fifty feet. As the Fortress passed over the U-624, seven Mk. XI depth charges spaced thirty-six feet apart were dropped. The rear gunner of

51. PRO, ADM/199/579, pp. 114-15.
52. PRO, ADM/223/16, p. 29.
53. PRO, ADM/119/579, pp. 88-89.
54. PRO, AIR/27/911, 7 February 1943; AIR/27/1223, 7 February 1943.

the aircraft reported that the depth charges straddled the U-boat just forward of the conning tower. Four depth charges fell on the starboard side and three on the port side of the German vessel. Two depth charges landed close enough to sink the U-624. She disappeared in a swirl of white water mixed with oil thrown up by the explosion of the depth charges, and in a short time a large area of the ocean's surface was covered with oil and wreckage. When the aircraft returned to Northern Ireland, the squadron commander noted: 'The attack was very well worked out, cloud cover being used very successfully. The results indicate at worst damage to the U-Boat, with a kill well within the bounds of possibility.' The squadron commander was either overly conservative or modest, for Flying Fortress J of 220 Squadron had, indeed, sunk the U-624.[55]

While control of the air obviously hampered some U-boats and proved of general assistance to escort vessels, it did not—and could not—eliminate the attacks of the former or obviate the responsibilities of the latter. Thus, during the afternoon and evening of 7 February SC 118's escorts made several contacts with U-boats. At 0045 on 8 February, the merchant ship *Newton Ash* was torpedoed and sunk,[56] undoubtedly by the U-402.[57] Proudfoot did not learn of the attack on *Newton Ash* until shortly after 0100, when he ordered the USCGC *Ingham* to assist the merchant ship. Quickly locating two lifeboats belonging to *Newton Ash,* the cutter circled the boats slowly in an effort to detect the presence of a U-boat. When the USCGC *Ingham* attempted to pick up the survivors, one lifeboat was found to be awash and listing. Because the ten to fifteen men in the lifeboat, all of whom had been 'exposed to the cold water and could not help themselves,' would not listen to instructions from the USCGC *Ingham* they capsized the boat when it came alongside the cutter. While some were caught under the capsized boat and others just disappeared from sight, still others were crushed between the heavy boat and the side of the cutter. In the end, only three men were picked up, and when the USCGC *Ingham* closed with the other lifeboat, it had only one man on board, and he was picked up without trouble.[58]

The tragic ending of *Newton Ash* was followed by the more complicated misfortunes of the Greek merchant ship *Adamas*. At 0140, the USS *Babbitt* reported to Proudfoot that she was standing by *Adamas,* which had been rammed on the starboard side by *Samuel Huntington*. At about 2130 on 7 February, while the convoy was illuminated by snowflakes, a U-boat was seen by the ship sailing in the column next to *Adamas*. This ship, in order to avoid the U-boat, turned hard to port. *Adamas* at the same time turned to port, but then put her wheel hard to starboard when she saw *Samuel Huntington* turning to starboard. Although *Samuel Huntington* put her engines hard astern, her bow smashed into *Adamas*'s engine room, and the Greek ship began to fill with water. Despite the panic on board *Adamas,* the ship's master wanted to wait until dawn before abandoning ship. One lifeboat had been destroyed during the ramming, and the other was disabled when a mate and three seamen attempted to lower it against orders. Eleven men went over the side with three of four of the ship's life rafts. The USS *Babbitt* signalled to the FFS *Lobelia* that there were sixteen men on board *Adamas* without a lifeboat to take them off. After the captain of the FFS *Lobelia,* which had arrived on the scene at 0205 8 February while closing from astern with SC 118, had decided that it was impracticable for his ship to go alongside *Adamas* in the heavy seas that were running, he informed *Adamas* by means of a loud hailer that the men remaining on board would be picked up with rafts at daylight. But the men on *Adamas,* determined to abandon ship, went over the side immediately. The FFS *Lobelia* had no alternative but to attempt to rescue them. Accordingly, she closed with *Adamas,* towing a Carley float with a light. As the FFS *Lobelia* passed slowly by the men in the water and on the raft, it was hoped that they would be able to grab the Carley float and then be pulled aboard the Free French ship: but only one man was saved in this fashion. By this time, HMS *Beverley* had joined the two warships near *Adamas*. FFS *Lobelia* managed to get alongside one of the rafts from *Adamas,* but two men were crushed to death between the raft and the side of the warship. Meanwhile, French seamen went over the side into the water in an effort to rescue some of the others. Of the thirty-two-man crew of *Adamas,* the USS *Babbitt* picked up twelve and the FFS *Lobelia* rescued thirteen. At 0403, owing to shortage of fuel, the USS *Babbitt* left SC 118 for Iceland, and following a conference between the captains of HMS *Beverley* and FFS *Lobelia,* the wrecked Greek ship was sunk with gunfire at 1140.[59]

U-Boat Command during the morning of 8 February issued orders for contact to be maintained with SC 118 and to continue to attack the convoy. But it was almost

55. PRO, ADM/199/1409, ff. 163-68.
56. PRO, ADM/199/579, p. 47.
57. PRO, ADM/223/16, p. 30.
58. PRO, ADM/199/579, pp. 116, 127.
59. PRO, ADM/199/579, pp. 47, 89-90.

impossible for these orders to be carried out, because RAF Coastal Command during the daylight hours of 8 February deployed ten aircraft in support of SC 118.[60] The first aircraft arrived over the convoy at 0742, and during the remainder of the daylight hours three aircraft were always in the vicinity of the convoy.[61]

12/8/3/43 to 12/14/2/43

The last days of SC 118, judged by any standards, were anticlimactic and consisted in large part of mopping-up operations and reassignment of escort vessels. At 1313, HMS *Beverley* and FFS *Lobelia,* steaming at twelve knots to overtake SC 118, sighted a drifting wrecked ship. The two Allied warships had orders to sink any wrecks encountered, and at 1345 both ships opened fire, with no effect, on the wreck. At 1440, HMS *Beverley,* because she was running short of fuel, sailed for Northern Ireland leaving the FFS *Lobelia* to sink the wreck. The FFS *Lobelia* fired four Mk. IX depth charges set to go off at a depth of fifty feet from her throwers. Two of the depth charges did not explode, but the other two not only sank the wreck but damaged the upper part of the FFS *Lobelia*'s thrust block. At 1710, FFS *Lobelia* had to reduce speed progressively because of 'extreme heat of thrust block.' Finally, at 56°34′ N, 21°34′ W, steering with her stern to the wind and with her engines making just enough power to maintain steerageway, the FFS *Lobelia* radioed to Proudfoot for assistance. At 0605 on 9 February, HMS *Vimy* reached the Free French warship and took her under tow. While being towed, the bearings in FFS *Lobelia*'s 'thrust block had settled down to new position of shaft,' and at 1936 FFS *Lobelia* was able to proceed without assistance. The Free French ship sailed at eleven knots to Greenock, where she arrived at 2104 on 11 February.[62]

At 1330 on 9 February, Proudfoot detached the seven ships which were bound for Iceland and were under escort of the USCGC *Bibb,* USS *Schenck,* and USCGC *Ingham.* These ships reached Reykjavrik on 14 February.[63] At 1700, a number of fast ships were detached to Liverpool under escort of HMS *Mignonette.* Those ships going to Northern Ireland were detached at 1700 on 10 February under escort of HMS *Anemone,* while the slower ships bound to Liverpool were placed under the escort of HMS *Campanula.* Proudfoot, his mission completed, steamed independently in HMS *Vanessa* for Liverpool and arrived off the Bar Light Vessel at 0819.[64]

The German U-boats lost contact with SC 118 early in the evening of 8 February, although U-Boat Command did not officially end the operation until the next day when the U-boats were proceeding in a general southwesterly direction either to be refueled at sea or to head for French bases.[65]

Aftermath

U-Boat Command was highly critical of the German campaign against SC 118, and the reasons for its attitude are not difficult to ascertain. Commander Roger Winn, RNVR, of the Admiralty's Submarine Tracking Room thought that one of the major reasons for the poor performance of the German U-boats 'lay largely in the disposition of the U-boats before the convoy was sighted and in the length of time that they had been at sea.[66] Winn, however, is only stating the obvious. If one uses Winn's figures, twenty U-boats were in one way or another involved in operations against SC 118,[67] but only nine of these U-boats actually came 'to grips with SC 118.' Of these nine, three were sunk and five were damaged—three seriously enough to force them to return to port. Out of a convoy of more than sixty ships the Germans managed to sink only ten Allied merchant ships, three of which were stragglers. No matter how one looks at these numbers, three U-boats for ten merchant ships constituted a failure and a setback for the Germans. The officials of U-Boat Command knew this and thought that 'more subs ought to have come against so numerous a group.'

By reading the U-Boat Command's radio transmissions to the PFEIL group, the Submarine Tracking Room in London and OP-20-G in Washington, D.C., knew that U-Boat Command was not satisfied with the attack on SC 118; although on the afternoon of 7 February, the Allied officers in London and Washington heard U-Boat Command proclaim a great victory, when it radioed to all U-boats that on the night of 6-7 February the U-402 had sunk six ships and the U-262 had sunk three ships. The U-609 was also mentioned for 'keeping contact tenaciously.' Baron von Forstner, the commander of U-402, was awarded the Knight's Cross for the action on the night of 6-7 February. But it was

60. PRO, ADM/223/16, p. 35; AIR/27/911, 8 February 1943; AIR/27/1223, 8 February 1943; AIR/27/1415, 8 February 1943.
61. PRO, ADM/199/579, p. 48.
62. PRO, ADM/199/579, pp. 89-90.
63. PRO, ADM/199/579, pp. 117, 127, 153-54.
64. PRO, ADM/199/579, p. 48.
65. PRO, ADM/223/16, pp. 30-31.
66. PRO, ADM/223/16, p. 31.
67. PRO, ADM/223/16, p. 36.

probably equally significant that U-Boat Command did not 'as has been so often done congratulate' all the U-boats in the PFEIL group for their effort. In fact, U-Boat Command, announcing its intention to study the action against SC 118, ordered each U-boat

> to make up for report exact route, chart of convoy operation with own route and enemy route on basis of shadower report on which you operated. Draw on tracing paper. Charts 1897 large and 1872 large. All dives, surfacings, airplane attacks, etc. are to be drawn in.

OP-20-G found this request 'a little surprising,' for it came so late in the war and it only restated 'Standing War Order 501' in the 1941 edition of 'Standing War Orders,' which required that 'sketches of battle situations (attacks on convoys, shadowing, etc.) as one among many supplements to be prepared for submission with the war diary.' To OP-20-G it appeared either that this material was no longer regularly submitted to U-Boat Command or that the request was unnecessary because in the normal course of events it would be submitted to U-Boat Command.[68]

Regardless of how long U-Boat Command's staff studied the after-action reports of the attacks against SC 118, its members would never find the actual reasons for the failure of the U-boats. The fact is that U-Boat Command lacked, and would never gain, some very important information about Allied anti-submarine operations. The Germans never knew that the Allies had broken their codes. Nor did they know the importance of D/F and especially HF/DF. U-Boat Command did not realize that there was a connection between radio transmissions made by U-boats at sea and the sudden appearance of Allied warships and aircraft ready to hunt down the U-boat which had made the transmission. One of the major reasons why more U-boats did not successfully attack SC 118 was that on almost every occasion when a U-boat made a radio transmission, an escort was sent to attack the German vessel. Equally important, the Germans lacked the means to counter the increasing use of aircraft by the Allies. Finally, the Germans, because of increasing Allied industrial and technological effort, were beginning to be confronted with more and more ships and aircraft equipped with more sophisticated weapons and instruments. Even after the Germans had been forced to break off major attacks against the North American-United Kingdom convoys at the end of March 1943, U-Boat Command did not realize that U-boats were not a weapon that could overcome the type of defense that the Allies were developing for convoys.

The Allies did not view the defense of SC 118 as a victory. All reports and studies of SC 118 point out a number of major shortcomings in Allied equipment, leadership, and organization. SC 118 had a powerful escort, made up of destroyers, large United States Coast Guard cutters, and corvettes as well as air support during a good part of the battle. Still ten ships were lost. Further, most of these casualties were inflicted after the convoy had gained the protection of VLR aircraft based in Iceland and Northern Ireland.

At the conclusion of one of several reports made to the commander of the escort, Proudfoot cites several major shortcomings of the Allied forces during the SC 118 operation. One was the failure to refuel escorts quickly at sea. Another was the setting off of snowflakes by mistake. During his experience with SC 118, Proudfoot came to the conclusion that illuminants, such as starshells, were of greater assistance to the U-boats attacking the convoy than to the escorts defending it. Also included among the defects cited by Proudfoot was the difficulty of having the senior escort commander to conn his own ship while at the same time giving orders to other escorts during a battle. To the commander it seemed obvious that an escort group commander should have his own separate plotting office with equipment necessary to command all the escorts in a battle. In addition, the commander of the escorts of SC 118 complained of difficulty in communication between escorts and 'that too much notice is taken of security at the expence of rapidity of communication.' The commander thought all escorts should be immediately fitted with VHF[69] radio transmitters. Nor was Proudfoot satisfied with the cooperation of the American escorts under his command, and he attributed this situation 'to mutual lack of knowledge of each others' communication procedure. . . .' Proudfoot also pointed out that no convoy could be effectively protected unless the escort commander's ship and at least one other escort in every convoy were fitted with HF/DF. On the specific issue of *H. R. Mallory,* which carried more than four hundred people and was capable of thirteen knots, he contended that it should not have been placed in a six and one-half knot slow convoy. The British officer ended his report by stating that none of the merchant ships in the rear of the convoy made any attempt during the action on the night of 6-7 February to pick up survivors and that the American escorts which did this task were very slow to

68. ACI, vol. II, ch. 2, sec. 8.

69. Very high frequency.

follow his orders to regain their stations in the convoy's screen.[70]

Various captains of the escorts also had complaints and suggestions in their reports on SC 118. The commander of FFS *Lobelia* wanted to replace the action station bells with 'strong Klaxons' and change various procedures for dropping depth charges.[71] Several commanders of American escorts complained that radio frequencies were overloaded and jammed up, and suggested, as did Proudfoot, that VHF voice radios should be used for communication between escorts. The commander of the USCGC *Bibb* complained that the hedgehog was useless until he obtained more information about the ballistics of the weapon because he could not tell at what range the missiles would strike the water.[72]

On 1 April 1943 the Admiralty's Anti-Submarine Division issued 'Analysis of U-Boat Operations in the Vicinity of Convoy S.C. 118. 4th-9th February, 1943.' This study of the battle for SC 118 was based on twenty-one different reports and is an overview of the action. The analysis's important conclusion was that SC 118's escorts were merely a collection of warships. Although their individual performance was very good, as seen by the number of contacts and encounters with the enemy plus the heavy damage inflicted on the U-boats by the escorts, the escorts of SC 118 had, nevertheless, not been drilled as a team and were unable to work efficiently with one another. Furthermore, a number of commanders of various escorts—this is especially true of the American ships—did not fully understand what the commander of the escort wanted and expected them to do. It was this failure to work as a team that resulted in the loss of seven ships on the night of 6-7 February. The report pointed out:

> There are various criticisms which can be made of the conduct of operations during this period but the point is that the sort of things which went wrong on this occasion can always be expected to go wrong when the escorts are made up of the miscellaneous collection of ships who have had no previous experience with each other.

The Anti-Submarine Division's analysis then addressed its attention to where the commander of the escort group should station himself during a night action such as the attack made on SC 118 on the night of 6-7 February. During this action, Proudfoot in HMS *Vanessa* was on the port side and in front of the convoy. The study maintains that the correct position for the commander of an escort group should be at the rear of the convoy so that he could obtain an overall view of what was happening in order to deploy his warships accordingly. The analysis goes on to state that the firing of a snowflake by mistake 'probably resulted in the Convoy's detection.' In addition, the escorts, when making the first attack on a sonar contact, should have dropped a full pattern of depth charges and not a five-charge pattern, which a number of SC 118's escorts did. The use of a sound signal to order a change of course for SC 118 resulted in the convoy being split into two groups, and it was only luck which prevented the U-boats from taking advantage of this situation. The analysis concludes with the statement that the HF/DF on the rescue ship *Toward* was of great 'material assistance to the Senior Officer in directing both ships and aircraft to the positions of shadowing U-boats.'[73]

SC 118's battles with U-boats were not unique, but they did typify the struggle for control of the North America-United Kingdom convoy route which were waged during the first months of 1943. If the Germans had been able to inflict upon the Allies an unacceptable casualty rate, the whole direction of World War II would have been changed, for the Battle of the Atlantic was a contest which the British, Canadians, and Americans could not afford to lose. As was the case with SC 118, it was not the Allies who had unacceptable casualties, but rather the German U-boats. The inability of the U-boats and U-Boat Command to come up with the weapons, tactics, and strategy to combat successfully Allied convoy escorts during the first months of 1943 was the turning point of the Battle of the Atlantic.

70. PRO, ADM/199/579, pp. 51-52.
71. PRO, ADM/199/579, p. 90.
72. PRO, ADM/199/579, pp. 122A, 132.
73. PRO, ADM/199/2017.

David Syrett received his doctorate from the University of London and is presently a professor of history at Queens College, CUNY. His articles have appeared in The American Neptune, Naval War College Review, Military Review, The Mariner's Mirror, Armed Forces and Society, *and others.*

Robert G. Albion
1896-1983
An Appreciation

By Archibald R. Lewis

IN early August 1983, Robert G. Albion died just a few days short of his eighty-seventh birthday. His passing brings an end to an era, since he was the last survivor of a group of talented scholars, including Samuel Morison, Ernest Dodge, Howard Chapelle, and William Baker, and who made American maritime history a lively and fascinating subject for a wide public audience.

Like all of this group, Robert Albion's entrance into this field of study seems somewhat accidental, since he never specifically trained for it. He attended Bowdoin College where he received an A.B. in 1918, and after a stint as an army lieutenant during and after World War I, became a graduate student in history at Harvard in 1920. There he specialized in general English History, although his Ph.D. which he completed in 1924 and was published in 1926, was entitled *Forest and Sea Power, The Timber Problem of the Royal Navy* and represented a major contribution to eighteenth-century naval and maritime studies. He became an instructor at Princeton in 1922 and married his talented historian wife and collaborator, Jennie Barnes Pope, a year later. While at Princeton, Albion's first published works were in non-maritime fields. These included an *Introduction to Military History* which appeared in 1929, *The Journal of Philip Fithian* which he co-edited in 1934, and a popular textbook on *The History of England and the British Empire* which he co-authored with his wife Jennie and Walter P. Hall in 1937.

Not until 1938 was he able to return to the naval and maritime field which he had covered so well in his *Forest and Sea Power*. In that year he published *Square-Riggers on Schedule* and a year later his *Rise of New York Port 1815-1860* appeared, a book which many still consider to be his most important single contribution to maritime scholarship. At the same time he was slowly transforming his popular undergraduate course at Princeton on British economic history into an even more popular maritime history survey soon to be known as "Boats" and one he continued to teach until the end of his career.

The coming of World War II saw him turn his talents to studies of mixed naval and maritime matters which resulted in his *Sea Lanes in Wartime* which appeared in 1942 and the *Navy at Sea and Ashore* which was published in 1947 and co-authored by S. H. P. Read. During this same period between 1943 and 1950 he served in the Navy Department as Historian of Naval Administration which earned him a *Presidential Certificate of Merit* in 1948 and enabled him to gather material and insights which he was able to display in his *Forrestal and the Navy*, which came out in 1961, and was co-authored by R. H. Connery.

In 1948 he ended his quarter century of teaching and service at Princeton and returned to Harvard as *Gardner Professor of Oceanic History and Affairs*, a chair he held until his retirement in 1963. At Harvard his undergraduate survey in maritime history proved even more popular with undergraduates than it had been at Princeton and he was able to continue to work actively in the naval and maritime field. In 1959 he published a study of trade with Africa in the mid-twentieth century entitled *Seaports South of Sahara*. In 1978, he wrote the middle section of *New England and the Sea* which appeared with B. W. Labaree and W. A. Baker as co-authors, and in 1982, more than fifty years after his first book had appeared, he published *Five Centuries of Famous Ships*, his last work. Even more important than any of these, however, was his *Naval and Maritime History, An Annotated Bibliography* which first appeared serially in *The American Neptune* and was finally published in a fourth revised edition in 1972—a work which deftly managed to separate the wheat from the chaff in the deluge of publications dealing with naval and maritime historical matters.

Albion's scholarly contribution was to give a special form and orientation to naval and maritime history which it has since largely preserved. While he was concerned in his writing and research with the broad canvases of naval action and strategy, maritime feats of sailing and life at sea—subjects that Morison and Carl Cutler handled brilliantly—he was more interested in the economics and administrative side of sea power and maritime affairs in general. He never forgot what every Greek, Genoese, Elizabethan, or New England captain knew instinctively; that what counted was returning to port with a cargo or ship which could be disposed of at a profit—whether it was in time of war or time of peace. He also understood that it was the administrative skills of a Pepys or a Forrestal that made possible the victories of a Blake, a Farragut, or a Nimitz. His belief in the im-

portance of the profit motive, which was a personal credo, gave a special character to his research and affected all who came under his influence.

While it is important to pay tribute to his scholarship, it was his teaching which was even more crucial in the development of maritime and naval studies in this country. His maritime history course begun at Princeton and continued at Harvard introduced hundreds of bright and sometimes indolent undergraduates to the maritime field and was the prototype of dozens of such maritime courses which now flourish everywhere. He was never dull and it is worthwhile remembering his reply to a sadistic and overly critical colleague who complained to him that he never flunked enough students in his courses: 'The difference between you and me, Joe, is that I teach my students.'

When his years as a member of the Harvard faculty had ended he continued to travel through the country and served as a visiting professor of the Universities of Connecticut, Maine, and Emory and Carleton College between 1964 and 1972. During these same years he lectured afloat in the Harvard Polaris Program and ashore at the United States Military Academy, the Naval Academy, the Coast Guard Academy, and the National War College. In 1959-60 he pioneered a special TV course on *The Expansion of Europe,* stressing maritime matters and sponsored by the Harvard Extension Department which broke new ground in presenting history over the airways.

Perhaps his most important late teaching assignment, however, was at Mystic Seaport where for two decades between 1955 and 1975 he was responsible for the summer program of the *Munson Institute of Maritime History,* a program which trained a surprising number of those who today are serving as curators or directors of North America's burgeoning maritime museums. At the Munson Institute he regularly invited lecturers from every branch of maritime history to address his students. Though he stuck rather strictly to his own views of naval maritime history in his teaching and cared little for newer subjects like underwater archaeology, marine art, or marine literature, he made sure that those who attended his Mystic summer sessions were grounded in the essentials of maritime history as the basis for their later careers, and he threw his weight to the same end as he served on various boards at the Peabody Museum and Essex Institute, the Penobscot and Maine Maritime Museums, and the South Street Marine Museum in New York City.

Finally, Robert Albion remained to the very end, a character that none who knew him will ever forget. Especially in his later years we enjoyed seeing him move into a gathering of maritime enthusiasts with a somewhat rolling gait and the mien of a benevolent and jolly Captain Bligh. Almost to the end he enjoyed good food, his evening martini or ration of dark Medford rum, and conversation peppered with salty anecdotes. We owe him a great deal and will all miss him very much.

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Book Review

JOYCE J. BARTELL, Editor, *The Yankee Mariner & Sea Power, America's Challenge of Ocean Space* (Los Angeles, California: University of Southern California Press, 1982). 6¼" x 9¼", cloth, 299 pages, graphs, drawings, tables, glossary. $20.00.

When fifteen of America's most renowned sea specialists sit down to write scholarly articles in depth on their chosen fields of expertise the public has a right to expect something out of the ordinary. They will not be disappointed with *The Yankee Mariner & Sea Power* for the volume represents not only papers especially prepared and presented at a Conference sponsored by the Center for Study of the American Experience, The Annenberg School of Communications, University of Southern California, but rather lectures rewritten into chapter formats, and then the entire collection reviewed yet another time, and eventually edited for final, formal publication. With a Foreword written by Captain Don Walsh, Director of the Institute for Marine and Coastal Studies, University of Southern California, and an Introduction supplied by Dr. Athelstan Spilhaus, originator of the Sea Grant program of the National Oceanic and Atmospheric Administration, the reader can rest assured that he is on the receiving end of a wealth of technological data, assembled under one cover, not commonly released to the public, at least in such readable style.

The short title of the book, as expressed by the Editor, Joyce J. Bartell, is *America's Challenge of Ocean Space,* which encompasses a lot of territory, if not water areas in this instance, and digs deeply into all of the elements of sea power from the historical perspective of the Yankee Mariner, to present an overview of the influence of United States' sea power in the past, in the present, and hopefully what should be its future. A great deal of it is not easy reading for every sentence is literally jam-packed with technical data with the assumption that the reader is already somewhat knowledgeable of maritime and naval affairs, at least to the extent he is aware of Mahan's theories, the ups and downs of naval construction representing changes in national policy, the business cycles affecting building and operating subsidies for a merchant marine, and the tremendous difficulties facing any firm whose specialty is underwater exploratory drilling for fuels and exotic minerals, to name but a few categories. Several of the chapters are so meticulously documented it would appear they will be considered a reliable fount to future graduate students and technical researchers, a veritable text no less. Similarly, although no classified information has been released, the amount of detailed, technical information, numbers and types, descriptions, capabilities, and limiting qualifications of naval craft, weapons, and weapons delivery systems discussed in the text provide a treasure trove for naval expert and naval buff alike. In fact, if the naval sections may provide interesting reading for American naval personnel, no less will some of the disclosures provide much food for thought for some Soviet naval members, who may or may not know as much about their own naval capabilities as some of their possible adversaries.

To attempt a full review of this volume would require a volume of its own to give the respective authors their due credit. The Chapter Headings alone provide the clues. Craig Symonds' *The Yankee Mariner, Seventeenth to Twentieth Centuries,* traces our maritime growth and search for a mission, commensurate with our ever-changing national policies, and concludes that 'like it or not' we are a sea power, and that we would do well to devise firm, practical national programs to protect and to exploit our riches of the sea, our environment, and our frontiers.

Captain Andreas Rechnitzer's *Ocean Science and Engineering, the Foundation of Effective Use of the Sea,* concludes that the need for oceanic research continues, commensurative with changing times and new scientific advances, and that whereas the Yankee Mariner's role may have been constantly revised, it nevertheless remains one of the props of our economic health and national security.

Arvid Pardo's *Role of the United States in the Development of Law of the Sea* discusses our 'frontiers' from the former three-mile limit to the Continental Shelf, the Territorial Sea, and the Contiguous Zone, with all the ramifications of International Law and Conferences on the Law of the Sea. He feels strongly that the United States should exercise a role in these vital areas commensurate with its international reputation, even to the degree of instituting an 'ocean space West Point' to provide advisory services of 'generalists' rather than 'specialists' (whom he fears too often tend to advocate special interest groups). Ann Hollick's *Politics in Ameri-*

can Uses of the Sea, 1970-1980, discusses conflicting claims pertaining to two competing elements: tremendous population growth, which has become increasingly dependent on the oceans for food and fuel, minerals and transport, and even waste disposal, and technological change which has enabled man to wipe out those resources, both pressures in turn generating major national and international political problems. Obviously, the United States is going to have to resolve these problems through pertinent legislation not just with coastal states and domestic users but also in the distant-water arena involving both developed and developing nations.

John Hattendorf's *Some Concepts in American Naval Strategic Thought, 1940-1970* relates to updating Mahan's concept of command of the sea during the past three decades: whereas his concepts seem pretty well vindicated by experience through 1945, times have drastically changed since then, particularly in the field of technology (which Mahan ignored), and aviation, the submarine, nuclear weapons—and the rise of the Soviet Navy—have made questionable a lot of what was once considered inviolate gospel. In fact, some of Clausewitz's emphasis on the relationship between military affairs and politics seemed more relevant in the formulation of American Maritime Strategy than the Mahan theme of exercising command through exclusive control of the sea. In any event, the unique problem which has confronted America since the late 1960's, has been to understand how to use naval force in a variety of roles, short of war, when faced with a rival naval force that was equally playing the same game.

Commander Michael McGwire's *The Superpowers at Sea: Two Studies in Sea Power* analyzes two contrasting systems: the Soviet is a continental power which has treated its navy as an expensive necessity rather than a preferred instrument of policy, firm in its belief that ground forces are the basis of national security. The United States, on the other hand, is a maritime nation, with its navy a favored device for furthering overseas interests. But whereas the Soviet may attempt to make greater use of their navy to achieve their national objectives, the United States may find its traditional use of naval power in peacetime losing much of its former punch in the face of dwindling allies, mounting costs, and changing world conditions, with increasing competition for the world's markets and resources. Captain Richard Ackley's *National Defense at Sea: The United States Navy* is a *Brassey's Naval Annual* and a *Jane's Fighting Ships,* revised and updated to the very last moment, all rolled up into one booklet, and with more statistics and hardware details than would normally be accumulated and disseminated short of an in-depth seminar at a high level naval strategy conference. He certainly lays it on the line, where we are strong and where we are weak. With our ever increasing naval requirements the strain on our ships and our planes, our personnel and our logistical back-up have assumed serious proportions to meet our manifold commitments, in contrast to our Soviet adversary who seemingly has strengthened his naval posture. Whether we can produce the necessary funding to assure our superiority, if not the very existence of our society, so dependent on being able to protect our oceanic interests, is a challenge which we must face and surmount.

Herbert Brand's *Marine Transportation: Moving the World's Trade* makes it crystal clear that things are not all right with America's merchant marine: that constant wrangling over what constitutes an adequate merchant fleet, with a wavering attitude toward shipbuilding and ship operating subsidies, so essential to compete with foreign vessels, and the lack of a long range, well defined policy to rebuild the United States-flag merchant marine where it can provide the logistical capability so necessary for the navy in time of war and for the nation's commercial interests in time of peace are most detrimental to our continued well-being. Our future demands the uninterrupted flow of critical raw materials; we must have the ships and we must have the manpower to fulfill this critical requirement.

Harry Brockel's *America's Seaports—Gateways for World Trade* informs us that as the world's population grows with commensurate exploitation of the world's resources, the demand for port facilities to handle total world trade (almost 99 percent by ships, a little over 1 percent by aircraft) by the year 2000 is going to be staggering. Although the United States moves but 5 percent of the world's trade on American-flag vessels, we are unquestionably the largest trading nation in the world (half of it is petroleum). In the years to come our port officials are going to be hard pressed to meet technological changes in cargo handling and labor union demands not to mention social, regulatory, and environmental challenges; moreover, it will require the fullest cooperation with other existing agencies equally concerned with port development and maintenance such as the U.S. Coast Guard and the U.S. Army Corps of Engineers. Donald Maus' *Energy from the Oceans: Its Development and Delivery* is one of the reviewer's favorite chapters, undoubtedly influenced by the excellence of the graphic aids accompanying the text. In it you will find 'every-

thing you always wanted to know about deepwater offshore petroleum drilling but didn't dare ask' (or couldn't find it written up so concisely in one booklet). One gathers that if the space age engineers and astronauts have had problems, no less challenging have been some of the situations confronting those who design and operate drilling systems on continental margins fully exposed to the elements. America pioneered the offshore oil industry in United States waters. For many years American companies led the way although by now it has become a veritable international enterprise, fortunately much of it under American control.

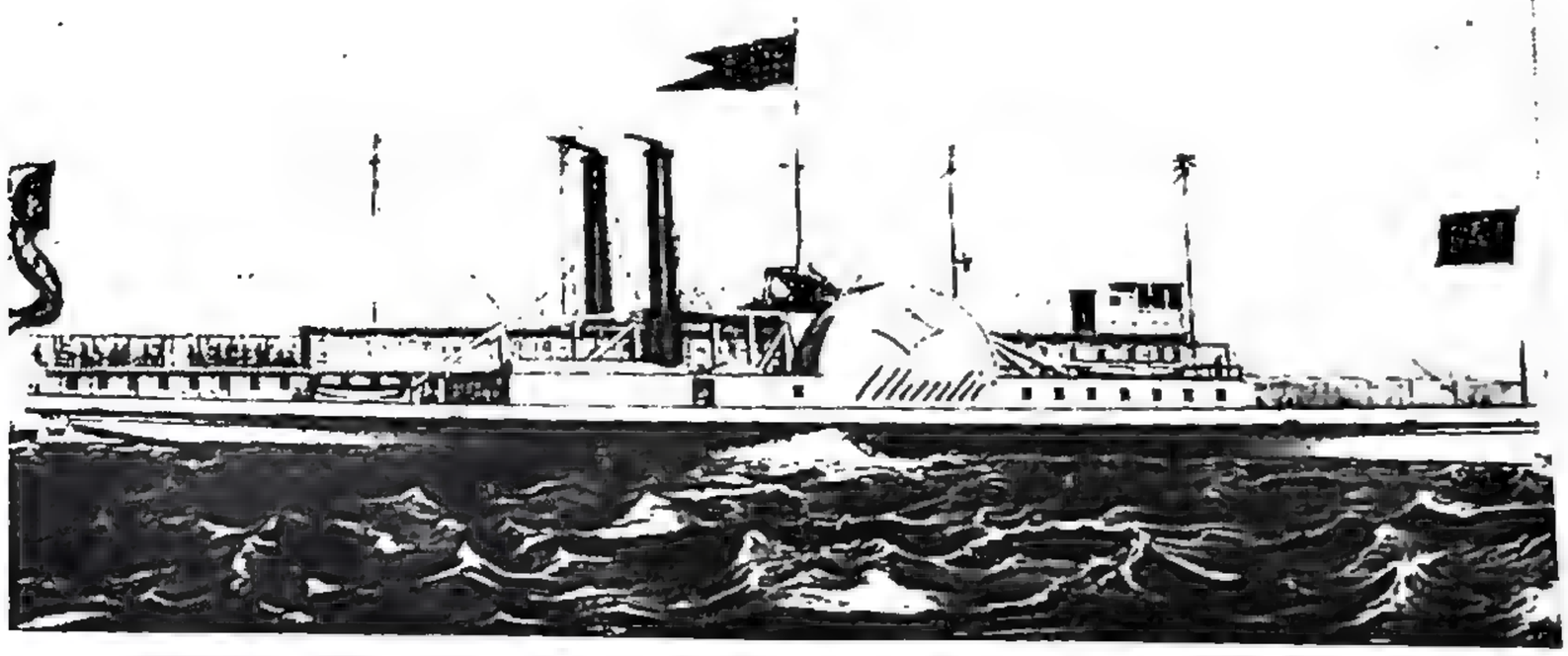
Professor John Flipse's *Ocean Mining and Minerals from the Sea* discusses in considerable detail the mineral crisis with specific reference to America's need to import such vital, strategic raw metals as manganese and nickel, copper, and cobalt in which the source countries may or may not be our allies, of critical importance in wartime, and even in time of peace so necessary for us to stockpile. For the United States to agree to some of the stipulations incorporated in the United Nations Conference on the Law of the Sea is viewed with some concern inasmuch as the so-called 'redistribution of the world's wealth' for all its altruism suggests nationalization, expropriation, cartels, etc. which may not be to our best interest, particularly when our economic survival and military security are so dependent on these scarce minerals. Clarence Idyll's *Food from the Sea* is an excellent dissertation not only on Sea Foods, Commercial Fishing, and Fishery Management, but also devotes considerable space to the tricky subject of 'Who Owns the Sea,' the limitations on foreign fishing, and the need for international cooperation to control this all important world food supply, once thought inexhaustible, but no longer taken for granted. In any event drastic measures are going to have to be implemented to protect the ocean environment to preserve future food fish stocks of all types.

Professor John Craven's *Images of the Sea: The Ocean and Culture* brings to this volume a welcome addition: an artistic appreciation of the seafaring world: its words and music, its light and color, motion and shape, the sea sounds, and the sea literature itself from Shakespeare to Tennyson not to mention such writers as Kipling, Masefield, Longfellow, Melville, Dana, Conrad, etc. Last but not least Don Walsh provides the 'Wrap-up' in *The Yankee Mariner in the Next Two Decades:* despite the fact that there is considerable evidence that Uncle Sam's image as a Yankee Mariner has materially diminished, particularly since the close of World War II, by no means are we facing a sinking ship situation. There are yet many corrective measures available in the damage control sector which can be implemented to bring us back to an even keel and a sure course, provided we are willing to spend the energy and the time, the resources, manpower, and funds to launch a concerted effort which will demand unselfish cooperation between innumerable agencies in the governmental as well as the private spheres of influence. If we fail as a sea power we're not going to make it as a nation. What we do in the next two decades to revitalize our nautical heritage and Yankee know-how in maritime affairs undoubtedly will decide our relative position in the world community for an extended period.

Without qualification a first-rate analytical book for many persons interested in sea power as a whole—not just naval ships and men but the merchant marine and the entire spectrum of the marine industry, trade and commerce, fisheries, and strategic materials. It contains a useful Glossary. To expect an Index would perhaps be too demanding. In any event citations are ample and should satisfy scholars. Best of all the book is eminently readable.

ROGER WILLOCK

Cumberland Foreside, Maine



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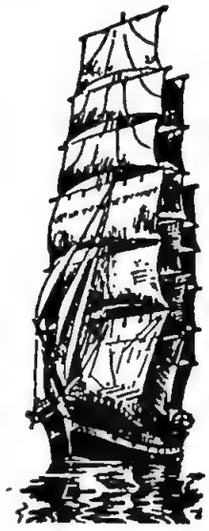

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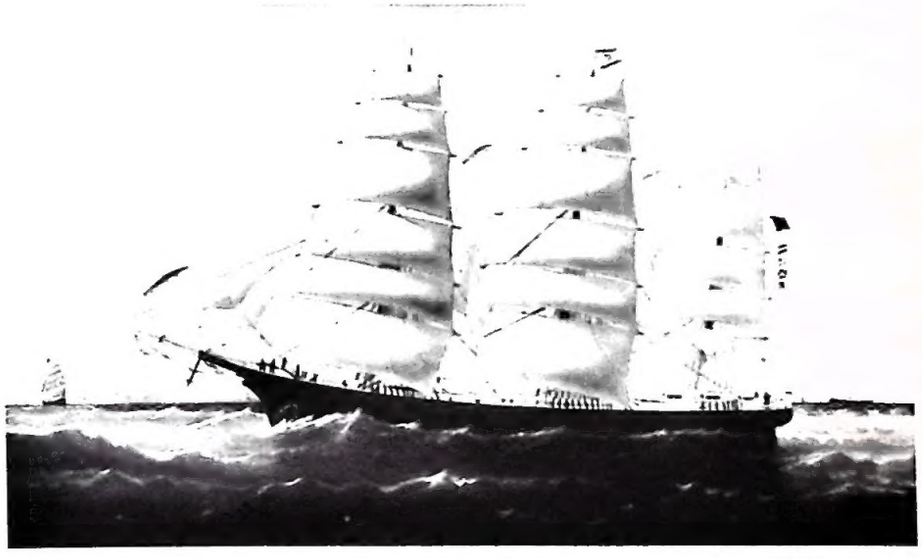

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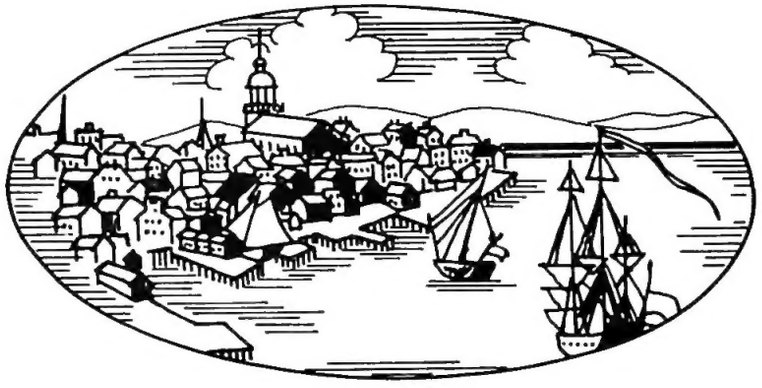

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